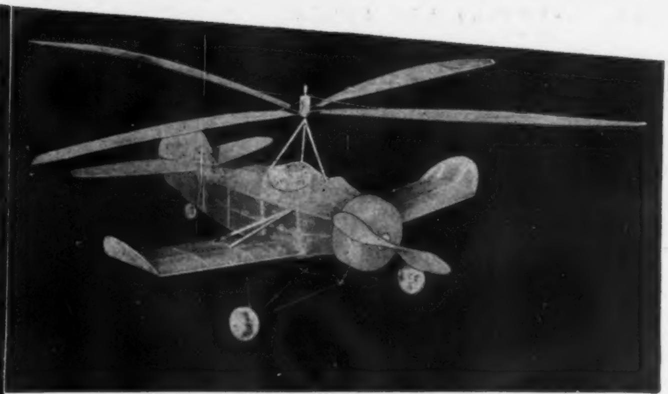
MODEL AIRPLANE NEWS

AUG. 1932 15¢

A COURSE IN AVIATION FOR FIFTEEN CENTS A MONTH!

THE DIRIGIBLE'S SPAWN—
THE F-9C2 FIGHTER. Plans Page 10



Boy-o, Boy! You've Simply Got to » »

SEE THESE MODELS FLY

• • • • • • • • • • • • • • To Appreciate Them

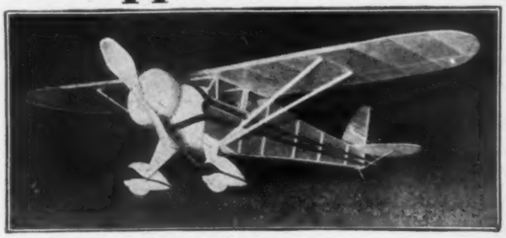
(Above) FLYING KELLETT

AUTOGIRO

2 FOOT ROTOR SPAN

For sensational flying performance you have got to build and own this Kellett Autogiro. During the past few weeks we have sent hundreds of these marvelous kits to wide awake model builders all over the country. This ship is an unusual, perfect flying scale model that everyone can well afford because of its popular price. It is guaranteed to fly when properly constructed from our copyrighted plans and is indeed a beauty in action. Will fly from 200 to 500 feet. Rotors are NOT powered, but work the same as the original Autogiro, rotating while flying. Complete kit includes full size plans and instructions, with all ribs, wing tips, bulk heads, etc., stamped on sheet balsa, and everything else required to make a complete flying Kellett Autogiro.

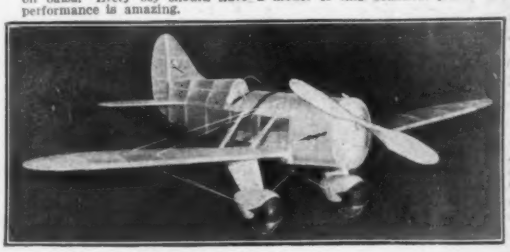
1.50 Post Paid



2 Ft. MONOCOUPE-110

1.25 Post Paid

This model is a faithful scale reproduction of the famous plane used by Livingston and Omlie in the National Air Race victories, and was produced by us in response to demands of boys who have been waiting for it. The most complete kit offered today. Contains everything to make a complete Monocoupe flying model including full size plans and all parts clearly printed on balsa. Every boy should have a model of this beautiful plane. Its performance is amazing.



2 Ft. GEE-BEE Sportster

1.25 Post Paid

A thrill and surprise awaits those who have not as yet built this wonderful model. A perfect reproduction of the record-breaking Gee-Bee Sportster. It is perfectly balanced, graceful, sturdy and easy to build. We cannot urge you too strongly to buy a Gee-Bee kit as it is a model you will be justly proud of. Kit includes full size plans, necessary parts clearly printed on balsa, and everything to complete the model.

Model Supplies at World's Lowest Prices!

A COMPLETE LINE OF THE WORLD'S HIGHEST GRADE OF MATERIALS

Scientific Balsa
36" lengths

1/16 x 1/16	1c	8 for 5c
1/16 x 1/8	1c	7 for 5c
1/16 x 3/16	1½c	6 for 7c
1/16 x 1/4	1½c	6 for 7c
1/16 x 1	4c	4 for 15c
3/32 x 3/32	1c	6 for 5c
1/8 x 1/8	1c	6 for 5c
1/8 x 3/16	1½c	6 for 8c
1/8 x 1/4	2c	6 for 10c
1/8 x 3/8	2½c	5 for 10c
3/32 x 1	5c	6 for 25c
3/16 x 3/16	2½c	5 for 10c
3/16 x 1/4	2½c	5 for 10c
3/16 x 1	6c	3 for 15c
1/4 x 1/4	3c	6 for 15c
1/4 x 3/8	3½c	5 for 15c
1/4 x 1/2	4½c	4 for 15c
1/4 x 1	6c	3 for 15c
1/2 x 1/2	8c	3 for 20c
1 x 1	17c	2 for 30c

Sheet Balsa
36-inch lengths

1/32 x 2 .... 4c
1/32 x 3 .... 8c
1/16 x 2 .... 5c
1/16 x 3 .... 9c
1/8 x 2 .... 6c
1/8 x3 .... 11c
1/4 x 2 .... 10c
1/4 x 3 .... 17c

Propeller Blocks

5/8 x 1/2 x 5 ... 1c
1/2 x 3/4 x 5 ... 3 for 4c
1/2 x 5/8 x 6 ... 3 for 5c
5/8 x 3/4 x 7½ ... 3c
5/8 x 1 x 8 ... 2 for 5c
7/8 x 1½ x 11 ... 7c
1 x 1⅜ x 12 ... 9c

1/64" Sheet Balsa

1/64" x 2 x 18" ... 3c

Compressed Air Motor Kit

Set complete 99c

Ready-Made Balsa Propellers

Guaranteed accurate. Complete with wire shaft and washers, ready to fly.

5" .... 20c | 8" 35c
6" .... 25c | 10" 40c
7" .... 30c | 12" 45c

Dummy Radial Engines

Made of black celluloid, 9 cylinders.

3" diam., each 30c
2" diam., each 25c
1½" diam., each 20c

N. A. C. A. Cowling

Each, 3" diam. 25c

Streamline Parts

Takes any wheel from 1⅜" to 1⅞" diam.

Pair 29c

Small pants take wheel from ¾" to 1" diam.

Pair 15c

Thrust Bearings

Large Size .035........ 2c
Per Doz. 19c
Small Size .025........ 2c
Per Doz. 19c

Wood Veneer Paper

Sheet, 20 x 30 .... 15c
Two for 25c

Reinforced Winders

Each 22c

Aluminum Cowlings

N.A.C.A. and open-face type.

2" diam. 30c
2½" diam. 35c
3" diam. 40c
3½" diam. 50c

Drag ring type.

2" diam. 25c
2½" diam. 30c
3" diam. 35c
3½" diam. 40c

Doughnut Rubber Air Wheels

1" diam., pair........ 18c
1¼" diam., pair...... 20c
1⅝" diam., pair...... 25c

Celluloid Wheels

Complete with bushings. All sizes come in red, yellow, white, green, blue and black.

¾" diam., pair...... 6c
1" diam., pair...... 8c
1⅜" diam., pair...... 11c
1⅞" diam., pair...... 16c
2" diam., pair...... 35c

Acetone

Large 2 oz. can....... 12c
Per pint 85c

Colored Dope

2-oz. Can 12c
Per pint 85c

Banana Oil

Large 2 oz. can...... 10c
Per pint 75c

Colorless Cement

Large 2-oz. can....... 16c
Per pint 95c

Japanese Tissue

For the Commercial Ship
Sheet 20½" x 24"...... 5c

Scale Model Tissue

Sheet 21" x 25"..2 for 5c

Colored Japanese Tissue

Red, blue, yellow, orange, brown, green.

Sheet 20½" x 24"...... 5c
6 sheets 25c

Music Wire (not coiled)

Sizes .014, .020, .028, .034
3 ft. for 1c

Scientific Expert Rubber

.045 sq. 3 ft. for...... 1c
1/16 Flat, 3 ft........ 1c
3/32 Flat, 3 ft........ 1c
1/8 Flat, 3 ft........ 1c
3/16 Flat, 3 ft........ 1c

Balsa Wood Wheels

Balloon type bushings included.

1" diam., pair......... 5c
1¼" diam., pair....... 6c
1½" diam., pair....... 7c

Sheet Aluminum

12" wide.

.001 per ft. 15c
.002 per ft. 15c
.003 per ft. 15c
.005 per ft. 12c
.010 per ft. 18c

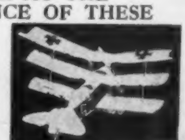
Aluminum Tubing

1/16" O.D. per ft..... 8c
5/32" O.D. per ft..... 8c
⅛" O.D. per ft..... 7c
3/16" O.D. per ft..... 11c
¼" O.D. per ft..... 13c

YOU WILL MARVEL AT THE AMAZING PERFORMANCE OF THESE

15 Inch Flying Models 99c each Postpaid

Spad Chasseur



Fokker Triplane

SE5 British Pursuit

Lockheed Vega

Complete in every detail. Includes full size plans and instructions. Guaranteed to fly.

How To Order Supplies:

1—Orders under $.25 not accepted.
2—Add $.15 for packing and postage on supply orders up to $1.50. Over $1.50 add 10 per cent.
3—Add 10c extra to above charges west of Mississippi.
4—Orders of $4.00 and over sent postpaid and insured in U. S. only, except balsa planks

Canadian Charges

5—Add 25c for packing and postage on orders up to $1.50. Over $1.50 add 15 per cent.
6—Postage stamps, Canadian or Foreign Coin not accepted as payment.
7—Remit by check, postal or express money order.

ALL KITS SENT POSTPAID!

Scientific Model Airplane Co., 277 Halsey St., Newark, N.J. (Dept. N-8)

—— Our Kits and Supplies are on Sale at Leading Department and Toy Stores

World's Largest Manufacturers of Model Airplane Kits and Supplies Exclusively

A Page Full Of The Best Values Money Can Buy

"Benco" Balsa Wood

Our Balsa Wood is the lightest and best balsa to be had. It is clear straight grained stock cut to convenient sizes.

36" Strips

1/16 x 1/16	.01	7 for	.05
1/16 x 1/8	.01	7 for	.05
1/16 x 1/4	.01	6 for	.05
1/8 x 1/8	.01	6 for	.05
1/8 x 3/16	.01½	6 for	.08
1/8 x 1/4	.02	5 for	.09
1/8 x 3/8	.02	5 for	.09
3/16 x 3/16	.02	5 for	.09
3/16 x 1/4	.02	5 for	.09
1/4 x 1/4	.03	5 for	.12
1/4 x 3/8	.03	5 for	.12
1/4 x 1/2	.04	5 for	.18
3/8 x 3/8	.05	5 for	.22
3/8 x 1/2	.06	5 for	.25
1/2 x 1/2	.08	5 for	.35
1 x 1	.17	2 for	.30

40" Strips

1/8 x 3/8	.04
1/8 x 1/2	.04
3/16 x 3/8	.04
3/16 x 1/2	.05

Sheet Balsa

1/32 x 2 x 36	.04½
1/16 x 2 x 36	.05½
1/8 x 2 x 36	.06½
3/16 x 2 x 36	.09
1/4 x 2 x 26	.11

Plank Balsa

1 x 3 x 36	.33
1 x 6 x 36	.60
2 x 3 x 26	.60
2 x 6 x 36	.90
2 x 5 x 40	.90

Balsa Propeller Blocks

1/2 x 3/4 x 5	3 for	.04
1/2 x 3/4 x 6	3 for	.05
5/8 x 1 x 7	2 for	.05
5/8 x 1 x 8	2 for	.05
3/4 x 1 1/8 x 8	2 for	.07
3/4 x 1 1/8 x 10	2 for	.09
3/4 x 1 1/8 x 11		.06
7/8 x 1 1/2 x 11		.07
5/8 x 1 1/4 x 12		.07
7/8 x 1 1/2 x 12		.08
7/8 x 1 1/2 x 14		.10

Dowels

Straight-grained genuine birch dowels in the following sizes:

1/8 diam.—18 in. long	6 for	.05
3/16 diam.—36 in. long	3 for	.05
1/4 diam.—36 in. long	2 for	.05

ABSOLUTELY FREE A BEAUTIFUL Glider Kit

Everything to Complete a Real Model Glider With a Purchase of $1 or More.

Bamboo

TONKIN straight-grained, no-knot bamboo in the following sizes:

1/16 x 1/4 x 15	.01
Per doz.	.08
1/32 x 1/4 x 8	.00½
Per doz.	.04
1/16 x 1/16 x 9—doz.	.03

"Alco" Colorless Cement

Absolutely the strongest, lightest and fastest drying colorless cement on the market! Try some Now!

2 dram tube	.05
1 oz. tube	.13
2 oz. can	.17
4 oz. can	.32
Pint	1.00

Madison "Ace" Rubber

Delivers more turns to the foot. Four sizes to select from at the lowest prices in America!

.045 square	3 ft. for	.01
3/32 flat	2 ft. for	.01
1/8 flat	3 ft. for	.01
3/16 flat	2 ft. for	.01

Celluloid Wheels

3/4 diam.—Pair	.06
1 diam.—Pair	.08
1 3/8 diam.—Pair	.11
1 7/8 diam.—Pair	.17
Bushings 4 for	.02

Dummy Radial Engines

Celluloid, 9 cylinders, 3 in. diam. Each .20

Music Wire

Strong, light and stiff. Sizes: .014, .020, .028, .034. 5 ft. packages.. .02

Aluminum Tubing

1/8 Outside diam. per ft.	.07
3/16 Outside diam. per ft.	.11
1/4 Outside diam. per ft.	.13

Sheet Aluminum

12 inches wide

.005 per ft.	.12
.010 per ft.	.19

Thrust Bearings

Strong and light. Large size....	.02
.035 hole. Each	.02
Per Doz.	.20
Small size, .025 hole. Each ..	.02
Per Doz.	.20

READ BEFORE ORDERING

In Order for Prompt Delivery Please Comply With Instructions Below

1. Orders under 25c not accepted—due to our very low prices.
2. Add 15c for packing and postage on orders up to $1.50; on orders for $1.51 and over add 10% for packing and postage charges.
3. Add 10c extra to above charges on Balsa plank orders less than $1.50 West of the Mississippi and Canada.
4. Postage stamps, Canadian or Foreign Coin not accepted as payment.
5. Remit by check, postal or express money order. Make payment to MADISON MODEL AIRPLANES, INC., 134 Livingston St., Brooklyn, N. Y.
6. Add 5c for insurance against breakage in transit.

Canadian Charges—Add 25c for packing and postage on orders up to $1.50. On orders of $1.50 and over add 15% packing and postage. Postage stamps, Canadian or foreign coin not accepted as payment.

Dealers and Clubs Write for Special Price List

Washers

1/8 O. D. Brass for light indoor models. Per Doz. .01½
1/4 O. D. Copper for outdoor models Per Doz. .01½

Covering Material

Newest thing in covering your models!

Aluminum Leaf

This material is pure sheet aluminum .0005 of an inch in thickness. Think of it, only one-tenth the thickness of writing paper. It is light, strong and makes a beautiful covering job. 3½ inches wide ...... 5 ft. for .05

Xtra-Thin Tissue

Absolutely the lightest covering material known to be had anywhere at any price. Use it for covering your endurance models.

Sheet 20 x 15	.05
Doz.	.50

Japanese Tissue. A strong, light tissue for covering your commercial models.

Sheet 20 x 24 2 for	.05
Doz.	.25

Colored Jap Tissue

Colored Jap Tissue, Red, Blue, Orange, Brown. Sheet .07
Per Doz. .75
Wood veneer paper for scale model work.
Sheet 20 x 30 .15

Clear Dope

This is real nitrate dope thinned down to meet the requirements of model airplane usage.

2 oz. can	.13
4 oz. can	.25
Pint	.90

Colored Dope

Real pigmented aircraft dope. Do not confuse this with dopes of inferior quality. Red, Blue, Yellow, Orange, Black, Olive Drab, and Silver. Order by color. 2 oz. can .13

4 oz. can	.25
Pint	.90

Acetone

To thin out your heavier liquids.

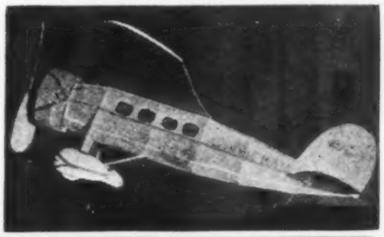
2 oz. can	.11
4 oz. can	.20
Pint	.80

• TWO-IN-ONE KIT •

Contains the around-the-world "Winnie Mae" and the "Trans-Atlantic Bellanca." Both 15" wing spans. Kit contains full size plans, bulkheads, large tube of cement and all other materials needed to complete these two wonderful models. Get yours now.

$1.25

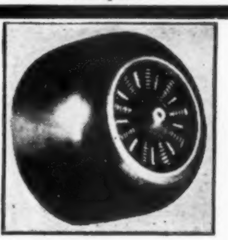
Postpaid



Outdoor Cabin Tractor

A twin pusher that has actually flown 12 minutes not once—but several times! This plane has several features which cannot be found elsewhere. It has a 40 inch "A" frame that is a marvel for lightness and strength, a 36 inch, high cambered, tapered wing, and two 12 inch, high pitch props powered by 48 feet of ⅛ flat rubber. The kit contains complete plans and instructions, stamped ribs, and all other materials needed for the construction of the model, Price **$1.50**

Add 10c for Postage



ALUMINUM N. A. C. A. COWLING AND THRUST BEARING WITH DUMMY MOTOR

Size of Cowling: Diameter, 3"—Depth, 2". Packed in cardboard box with mounting instructions. If ordered separately, add 5 cents for packing and postage **50c**

Outdoor Twin Pusher

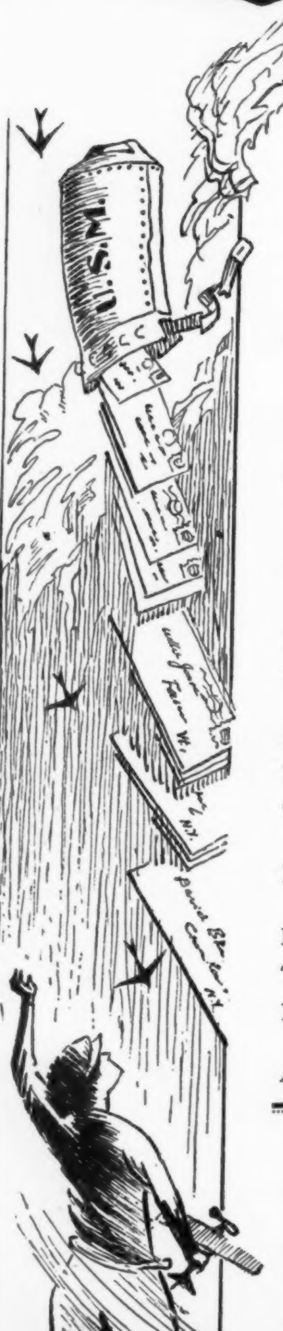
One of the snappiest flying models in its class, proper engineering and all balsa construction does it. This plane has a double surfaced, high lift wing, 30 inch span, all balsa fuselage, extra strong landing gear to withstand the shocks of outdoor flying, and a large, wide bladed propeller to keep it up for long endurance flights. The Kit contains complete plans and instructions, stamped ribs, large tube cement, 1 oz. bottle clear dope, pair celluloid wheels, and all materials needed to complete the model. Price **1.50**

Add 10c for Postage.

MADISON MODEL AIRPLANES, Inc., 134 Livingston St., Brooklyn, N. Y.

Our Kits and Supplies Are Handled by Leading Department Stores—ASK FOR THEM

and JUNIOR MECHANICS—Vol. VII No. 2



Edited by ***Charles Hampson Grant***

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In Our Next Issue

A CONTEST MODEL BY WORLD EXPERT

One Of The Most Expert Model Builders in the World will tell how to build a contest Endurance Tractor, that has flown for Fourteen Minutes. Let us introduce you to Mr. Carl Goldberg, who has broken nearly every record there is to break.

FLYING SCALE BOEING BOMBER

The New sensational Boeing Bomber has created great interest among those in the "Know." Howard McEntee provides you, here, with a remarkable flying scale model of it.

MODEL AIRPLANE CARRIER

Our old friend, Lt. (j.g.) H. B. Miller, has worked out some excellent plans with building instructions for a Navy Airplane Carrier that will appear in Our Next Issue.

LOCKHEED ORION

Plans and Instructions to build a Solid scale model of one of the Fastest and Most Modern commercial planes, the 200 mile an hour Lockheed Orion by Robert Morrison. Also, there will be a three view drawing of this ship, by Stockton Ferris.

Also, don't miss the course on the Aerodynamic Design of The Model Plane by Charles Hampson Grant, or "Whats" and "What Nots" of Model Plane Building By Howard McEntee. Herein will be things Every Model Builder Should Know.

Another Exciting and Historic Story of a World War Ace, By F. Conde Ott, will appear to capture your fancy; Also other interesting features, not to say anything of your own Column, AIR WAYS.

Order Your Copy of MODEL AIRPLANE NEWS from your newsdealer now, or send $1.65 for your year's subscription to this office, 570 Seventh Ave., New York City.

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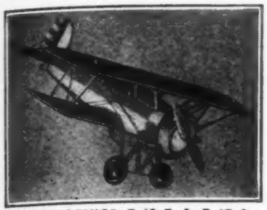
Contributors are especially advised to be sure to retain copies of their contributions, otherwise they are taking unnecessary risk. Every possible effort will be made in our organization to return unavailable manuscripts, photographs and drawings, (if accompanied by postage) but we will not be responsible for any loss of such matter contributed.

FEAST YOUR EYES ON THIS INTERESTING FLEET OF NEW NATIONAL MODELS

12" Midgets — 18" Juniors and 24" National Flying Scale Models Ranging in Price from $1.00 to $2.50



NEW BOEINGS P-12-E & F-4B-3
18" Complete Kit with detailed Blueprint and inst. to build both models.
Combination Construction Kit **$2.50**
Blueprint only, 45c

CURTISS CONDOR BOMBER
18" Construction Kit complete with Blueprint and inst. **$1.50**
Blueprint with inst. only, 35c

MIDGET CURTISS X F9 C-2
The Small Navy Fighter, flown with the Akron.
12" Construction Kit complete with Blueprint and inst...... **$1.00**
Blueprint with inst. only, 25c

CURTISS A-8 ATTACK PLANE
18" Construction Kit complete with Blueprint and inst..... **$1.50**
Blueprint with inst. only, 25c

NEW!! MODEL THESE FIGHTING TWINS OF THE U. S. A.
New Boeing P-12E Army Pursuit and F4 B-3 Navy Fighter illustrated top left.

The P-12-E "Army Scrapper" is rated the fastest air-cooled pursuit plane in the world. It's Navy twin F4 B-3 dive Bomber and Fighter is the U. S. Navy's fastest war bird.

You Can Own and Fly Both These Models for $2.50.

National Engineers have designed these two planes and packed them in one kit which contains full size blueprints, detailed instructions and all necessary material to the last detail, so that you can easily build and fly these two 18" realistic models, at the usual cost of one.

CURTISS XF-C-2 is the little Navy Fighter attached to the Akron, just as shown on the cover of this issue. It models perfectly in a 12" Midget as here illustrated. You will be sure to want one of these new defence models.

CURTISS A-8 ATTACK PLANE is the new Army ship that you have read so much about. Build a perfect model with the 18" National Junior Kit. It is different than any other weapon of the air you have yet built.

BELLANCA AIR BUS. The ship chosen by Stanley Hausner on his recent attempted flight to Poland. Build the model and see for yourself how this ship remained afloat for 8 days, saving the flyer's life.

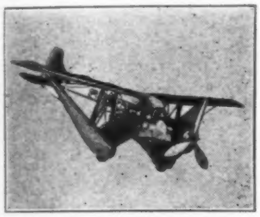
LOCKHEED VEGA Amelia Earhart's successful trans-Atlantic Solo Flyer. The National 12" Midget model makes a most pleasing miniature.

The well known Curtiss Hell-Diver, Fokker D-VIII, British Supermarine, and Nieuport (A French war time plane) as shown here, are all corking National Models,—for you to select from.

Satisfied Customers Prove National's Policy Right.

Each kit designed for easy construction and excellent flying ability. All orders (except ready to fly models) shipped same day. National **blueprints and instructions are complete in every particular. Each Kit** contains all necessary material to the last detail. National features, not found in many kits, are: Correct colored tissue covering and insignias, printed and cut wood parts, formed wire parts, pants and wheels according to type of plane. **All kits and supplies guaranteed** as represented or money refunded.

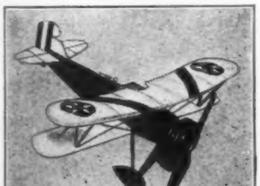
MIDGET NIEUPORT
12" Construction Kit complete with Blueprint and inst..... **$1.00**
Blueprint only, 25c



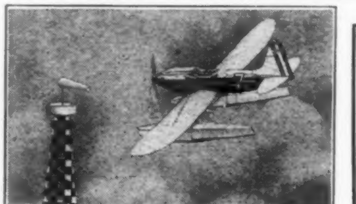
MIDGET BELLANCA AIR BUS
12" Construction Kit complete with Blueprint and inst..... **$1.00**
Blueprint with inst. only, 25c

MIDGET FOKKER D-VIII
12" Construction Kit complete with Blueprint and inst....: **$1.00**
Blueprint with inst., 25c

FREE National Monthly Bulletin—Supplements the General Catalogue. It's chuck full of News to Model Builders. Illustrates and describes in detail newest models. **Quality Supplies** at new low prices and Special Monthly Offerings. WRITE FOR YOUR FREE COPY TODAY. COMPLETE CATALOGUE E., 5c.



MIDGET CURTISS HELL-DIVER
12" Construction Kit complete with Blueprint and inst..... **$1.00**
Blueprint with inst. only, 25c



BRITISH SUPER MARINE
18" Construction Kit complete with Blueprint and inst. **$1.50**
Blueprint with inst., 35c

AGENTS WANTED

We want one dealer or agent in every town to handle National Model Airplane Sets and Supplies. Because of their proven quality, a National model dealer with sets and parts to supply immediate wants can build interesting and profitable business. Write for full details.

Name..........................

Address ....

MIDGET LOCKHEED VEGA
12" Construction Kit complete with Blueprint and inst..... **$1.00**
Blueprint with inst., 25c

OTHER MIDGET MODELS

12" Wingspread. $1.00 Each.

Curtiss Hawk	S. P. A. D.	Lockheed Sirius
Heath Parasol	Albatross	Pfalz Scout
Fokker D-7	Fokker Triplane	Sopwith Camel
British S. E. 5	Boeing P-12	Gee-Bee Sportster
Curtiss Robin	Texaco-13	Laird-400
Curtiss Falcon	Sikorsky S-38	Polish P-6
	Bellanca	

Any Midget Blueprint 25c
Any Midget Model Ready to Fly........ $4.40

SENIOR MODELS

AT NEW LOW PRICES

Any 24" Wingspread—now—$2.00 Each.

Curtiss Army Hawk	Fokker Triplane	Stinson Detroiter
S. P. A. D.	Albatross	Lockheed Sirius
British S. E. 5.	Boeing P-12	Heath Parasol
Nieuport Scout	Vought Corsair	Gee-Bee Sportster
Fokker D-7	Texaco-13	Laird-400

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Afloat Eight Days In a Land Plane

The Hazzards of Trans-Atlantic Flight and Probable Reasons Why Hausner's Land Plane Remained Afloat for More than a Week

By Frederick K. Teichmann

Assistant Professor of Aeronautical Engineering
Daniel Guggenheim School of Aeronautics
New York University

EVERY time an attempt is made to cross the ocean in a land plane, speculation is rife as to what chance the daring pilot has to come out alive from his mad adventure. Each time he is successful, it is chalked up as "just another one that Father Neptune didn't get," and the incident is forgotten—at least by most people.

Much has been written about ocean flights that emphasizes the thrilling, romantic and dramatic side of these undertakings, which indeed has great merit. By this time you undoubtedly have read all there is to know about the thrill of Hausner's dramatic experience. The excitement of his experience, the romantic side, has been fully exploited. However, at this juncture we believe it fitting to tell something about the hard facts that the venturesome ocean going pilot must face. Now let us consider the technical angles of his eight days on the sea. What are his chances? Why are land planes used at all for trans-oceanic flights which are over water for more than 90 per cent of the total itinerary?

A genius in airplane designing, Mr. Bellanca (left), wishes the intrepid Hausner "Good Luck" before his memorable flight.
—International News Photos, Inc.

A land plane is lighter than a seaplane. By substituting two floats for the wheels, from two to three hundred pounds of dead weight are added which might well have been used for additional fuel. Three hundred pounds is the equivalent of 50 gallons of fuel which would be sufficient for about two hours of flight, for a 300 horsepower engine, assuming that an engine uses approximately one-half pound of fuel per horsepower per hour. This extra fuel might very well mean the success of a flight. The additional fuel is not all. The floats add resistance to the plane, and so the seaplane is slower than the same plane used as a land plane. It is for this reason that some fliers like to drop the landing gear or retract it into a wing or fuselage, so that the resistance of the plane may be reduced.

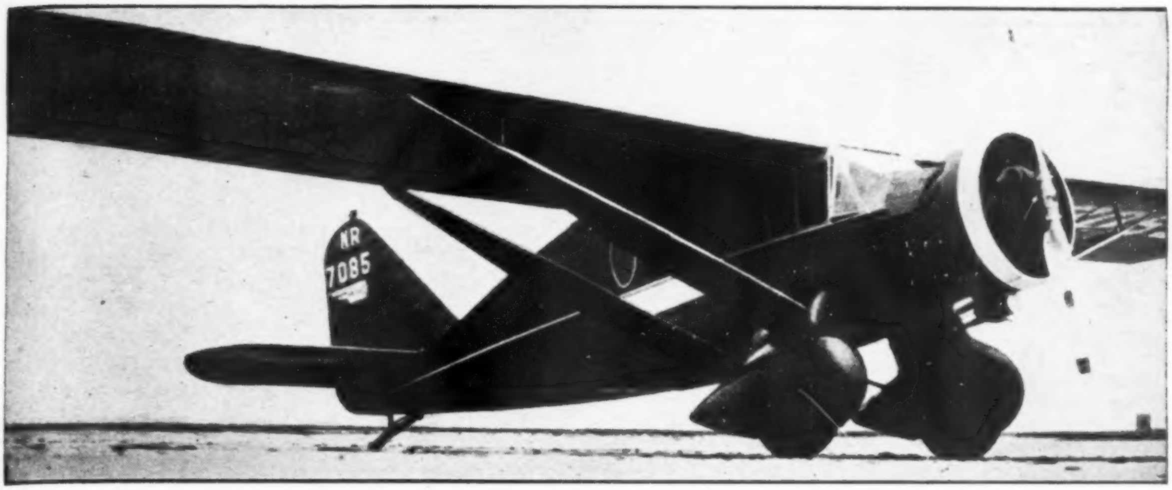
GRANTED that the land plane is better for the reasons given above, what happens when the land plane is forced to land on water? The recent rescue of Hausner after spending a week afloat on his derelict plane in the ocean, undoubtedly proved that life is not lost when the pilot has to make a forced landing in an open body of water.

Investigations of the chances of failure of the engine to function due to gas lines or oil lines clogging up, or similar causes of engine failure, show that the single engine plane has about 9980 chances out of 10,000 to complete its schedule; provided, of course, that the schedule does not include more than 500 miles of flying. The longer the flight, the less the chances of completion, so that in trans-oceanic attempts where the route is hardly ever less than 2500 miles, the chances are considerably less. Unfortunately not enough statistics are yet available for an accurate estimate.

Outside of the mechanical failures, weather conditions, insufficient fuel, and the lack of stamina of the pilot himself may force a pilot down.

If the weather conditions are severe, such as heavy storms causing heavy seas, the land plane with its pilot is doomed when forced to land, and perhaps only occasional debris will mark the fate of another gallant attempt.

Few trans-oceanic flights are attempted with an insufficient fuel supply. However, the airplane engine operates at its best fuel consumption at some particular speed just as the automobile engine uses less fuel per horsepower mile



The Bellanca plane that Hausner flew. Note the unusual landing gear of novel design, that may have increased the plane's buoyancy. *—International News Photos, Inc.*

when going, let's say, at 40 miles per hour than when going at 60 miles an hour. If then, the airplane engine runs at the most efficient speed, the fuel reserve will be greater.

SHOULD the pilot, due to ignorance or particular weather conditions, be forced to operate at a different speed, even his calculated fuel reserve will be used up. This has often occurred, even in successful trans-oceanic attempts, when heavy head winds, which retard the progress of the plane, and fogs have caused sufficient delays to reduce the precious, and already slender, margin of fuel reserve.

Unless the pilot is accustomed to "blind" flying—that is, flying by the use of instruments alone without reference to outside visual aids—he is liable to fall into a spin since he no longer can properly co-ordinate the various controls and so finally loses control of his plane, falls into the sea, and is lost forever.

HOW many trans-oceanic flights have ended in such disaster is open only to conjecture.

Outside of such a landing, the pilot may be forced to land the plane due to fatigue, engine failure, or lack of fuel. Fatigue of the pilot has probably not been the cause of any unsuccessful attempt. The excitement, worry, the noise, the determination to win, and usual previous preparation helps the pilot pull through. Besides, a thirty-six hour stretch is not very long, in the ordinary sense, although it may seem like eternity to the man flying, and provided he can keep awake when his first rest period arrives, the next is easier to survive without sleeping.

Suppose the landing is forced due to engine trouble or lack of fuel. Provided the sea is moderately smooth, the plane may be landed safely. It will be sudden since the surface of the sea is not hard enough to sustain the wheels, and once the plane strikes, it will stop. It will require finesse to avoid even the major jars, but it can be done.

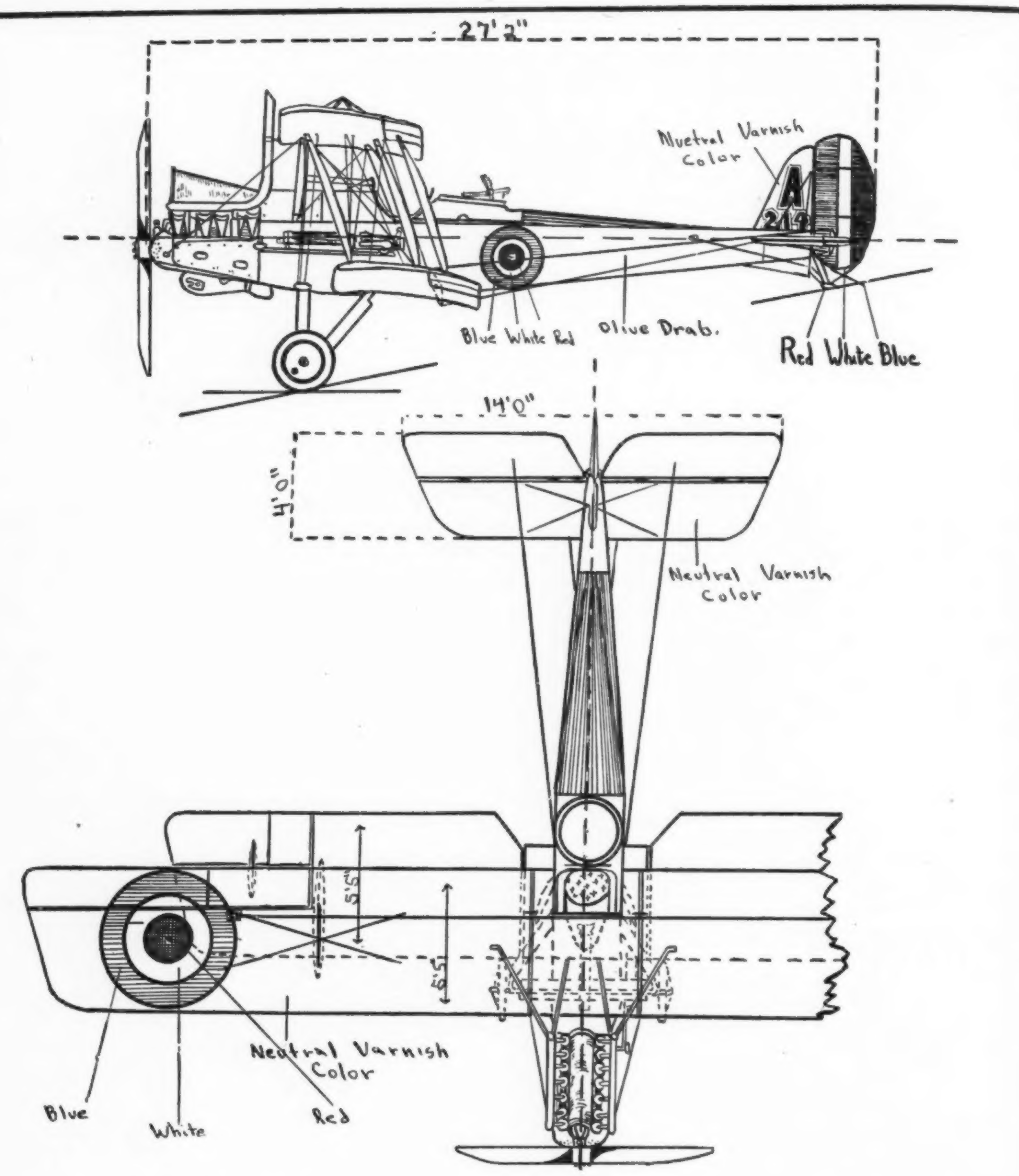
Once the plane has landed, and the plane remains afloat (as it can, as we know; why, we shall see later) the only worry will be the roughness of the sea. It will take little to imagine what mountainous seas, such as encountered by sea going vessels during the winter time, will do to a fragile plane. It would disintegrate within a few minutes, and he would be the greatest fool who would attempt a flight in storms that produced such seas.

WHAT kept Hausner's plane afloat? Hausner used a Bellanca, of the Pacemaker type, for his trans-Atlantic attempt. It was equipped with a gas tank in each wing, and one in the cabin behind the pilot.

The construction of the plane has particular bearing on its remaining afloat. The ribs and spars of the wing were made entirely of wood. The lift struts, which support

(*Continued on page* 38)

The "Take-Off" at the start of the flight, bound for—? *—International News Photos, Inc.*



British R.E.8 130 H.P. R.A.F. Engine.

"Whats" and "What Nots" of Model Plane Building

Here, You Can Get the Low Down on Body or Fuselage Construction

By Howard McEntee

Chapter 2

TO START with, we shall consider the fuselage of the model, because, no matter how simple, it is the backbone and base to hold all the other parts. The various general types of construction will be described first, along with shortcuts to aid the work, and later special features such as bracing and laying out will be touched upon.

It must be remembered that while there are only five or six types of fuselage construction, these may be combined in part when building some particular model, so that by building part in one way and part in another we may get a dozen or more combinations. An example would be a fuselage, the forward half of which is made of flat balsa for strength, and the rear half the built-up style for light weight.

The simplest of all fuselages is, of course, the stick type, in which a single stick serves as motor base, body, wing support and perhaps even tail skid. For simplicity this type is unexcelled, but it is also used in the most carefully engineered models, such as duration and R. O. G. types. For the duration model, the stick need be just strong enough to stand the rubber pull without too much bending. For a beginner's R. O. G. model, it should be somewhat stronger to stand the wear and tear. The stick is sometimes built up for strength and light weight, and in this case the rubber may be put inside making a cleaner model. The built-up stick is mostly square or round, the former being built up of flat strips, or else with a U-shaped piece and a top or cap strip. The round style can be made by wrapping balsa veneer around a dowel stick, first soaking the balsa in water. When dry, wrap a piece of waxed paper around the dowel and put the balsa back on, gluing the edges carefully together. These may be held with pins or rubber bands, and the joint should be a butt joint, that is, the edges should meet but not overlap. The rubber bands are preferable because glue does not adhere to them.

These single stick types are used both as tractors and pushers. Another variation is shown in Fig. 1, which has the one stick but uses two propellers. The cross piece which holds them is braced and covered to form a Vee shaped tail. A single main wing is usually used and sometimes a small stabilizer is placed on the nose end. With this type, care must be used to have both motors of equal power and wound equally so the stick won't be bent.

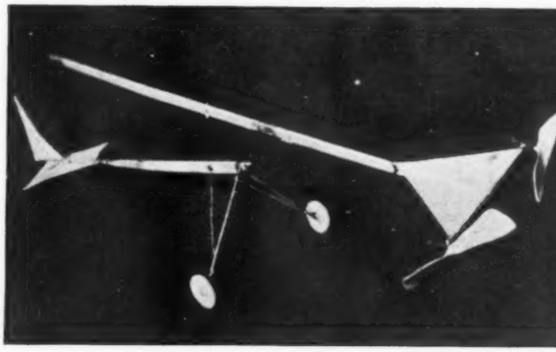


Fig. 1. Bodies or frames of the stick type for a tractor and a pusher

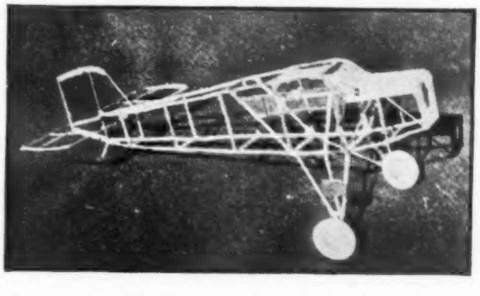


Fig. 2. Fuselage of a cabin type plane. Upper longerons are not continuous from front to rear

ANOTHER stick type of fuselage is the familiar A frame twin pusher model. This is simply two single stick fuselages, complete with motor and propeller, fastened together at the nose and separated just enough at the rear so the propellers will not hit when turning. This style of model is almost invariably used as a pusher with the small wing at the nose, this wing acting both as stabilizer and providing lift. Sometimes a flat tail is provided between the main longerons at the rear end of the frame to provide additional stability. This type of model, sometimes called the "Canard," is used exclusively for high-performance flying, this is, for high speed or great duration.

A simple, though rather heavy, type of fuselage is the profile type. In this the fuselage side elevation is drawn on and then cut from a piece of flat balsa, the rubber generally running through a lengthwise slot in the wood. Thus when viewed from the side the fuselage has the appearance of a real airplane, but from front or top it is just flat. It is a good type for the beginner to make following the stick model, for it is simple, strong, and looks much better.

In considering the built-up type, the simplest is that with four longerons or lengthwise pieces running from front to back, with suitable upright and cross braces. When building a model of this sort, *always* build the sides first, then glue them together with cross pieces. The plans, such as are published in MODEL AIRPLANE NEWS, have the side views given full size. Get yourself a large flat board of pine about 1' x 3' and an inch or so thick. Lay out on this the fuselage side view, tracing with carbon paper if you wish, and drawing in only the essential lines of the longerons and uprights. Then cut the longerons to length and hold them to shape with pins, lastly cutting and fitting in the upright pieces. When all are cut, glue them and set aside to dry. Be sure to allow plenty of drying time, as the side is very apt to spring out of shape if you don't. When sure the side is dry, cut off by carefully running a

razor blade under it where the glue has stuck to the board. Before removing, however, trace all around the outline with a sharp pencil point, and when making the second side, build it right over these new lines rather than the original ones. They will differ only a bit from the originals, but we want both sides absolutely alike so the finished fuselage will be symmetrical.

If you wish to make the sides directly over the drawings, you may do so by laying the drawing on your board and putting wax paper over it. In this way, your drawing will only have a few pin pricks in it.

WE ARE now ready to fasten the sides together. On almost any fuselage, the widest part is near the front, say one third back from the nose. Here, also, you will find some portion of the longerons between two stations, (a term used to designate a particular distance back from the nose, where uprights or cross-pieces join the longerons) which is flat vertically. By this it is meant that there is no bend up or down when the side is held in its normal position. This flat section is usually found in the top longeron, which in fact, is flat for its entire length on most models. The two sides are laid on the board in their respective positions with the flat portion down, a small weight being laid on the longerons to hold the sides upright. After lining them up carefully, glue in four cross pieces, two on top and two on the bottom. When the glue has set slightly, test the sides with a small square or an architect's triangle to make sure they are absolutely vertical. Hold the assembly in position with small cans, bottles or any convenient weights until the glue dries hard. Then remove from the board and install the rest of the cross pieces, both front and rear, cutting the top and bottom pieces together so they will be equal in length. This finishes the bare fuselage. It was mentioned at the start of the assembly directions that the fuselage to be described was one in which the longerons ran continuously the whole length of the fuselage, but the directions hold equally well for the type shown in Fig. 2. Here the top longerons are cut and pieced near the nose to form the windshield, but the assembly procedure is identical with that previously given.

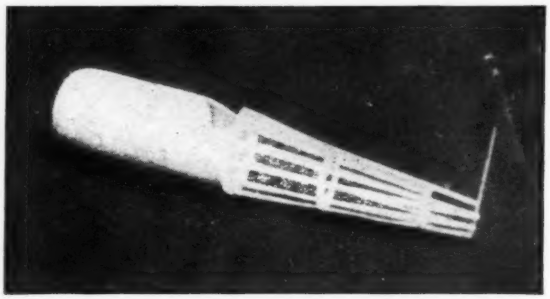


Fig. 4. A rounded fuselage of balsa sheet and stringers

We shall now take up the fuselage nose pieces briefly since they may be considered as the combined cross pieces and uprights at the nose. We usually make them of sheet balsa of about 1/8" to 1/4" in thickness, 1/4" being average for a two-foot model. These are thick so they will not break easily if the model hits an obstacle head on. The

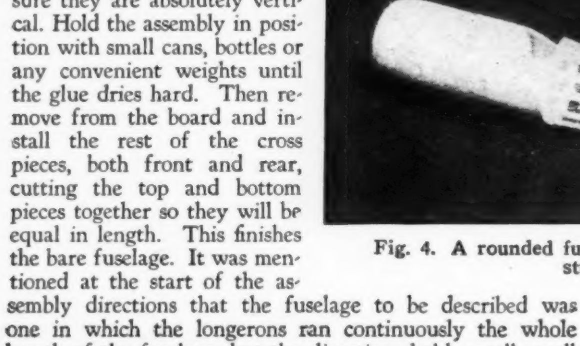


Fig. 5 shows the two hollowed-out halves of balsa fuselage. Bulkhead is in plane

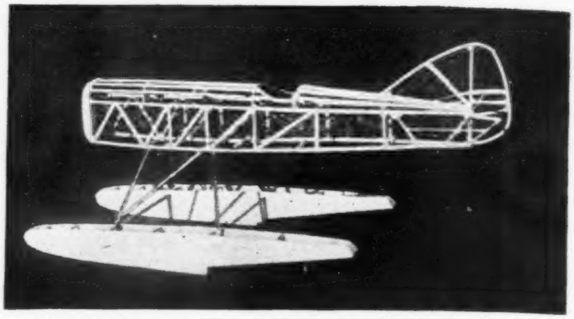


Fig. 3. Open cockpit fuselage showing formation of rounded cowling

longerons usually are glued into notches cut in the proper places. The nose pieces are made in numerous shapes, being circular if a radial engine is to be copied, or being shaped like the radiator if the large ship has a liquid cooled engine with nose radiator, an example of the latter being shown in Fig. 3. A slot or hole must be cut in the nose piece before assembly, to allow the motor stick to pass through. The motor stick clip is glued to the rear of the nose.

On ships which have a fully cowled-in radial engine, the nose piece is made to simulate the entire cowling, so it may be an inch or more thick. Do not be afraid that it will be too heavy, because we must have a heavy nose to offset the weight of the long tail and the tail surfaces. In the large planes, this nose weight is, of course, the heavy engine.

THE next type fuselage is that in which the top is in the form of a rounded cowling, Fig. 3 being a good example of this. The sides are made first just as for the square type but instead of top and bottom cross pieces we cut our top pieces to a round or semi-circular shape from thin sheet balsa, the pieces so cut being called formers. As seen in Fig. 3 the bottom longerons are flat between stations 1 and 3 so we begin assembly at that point. If you wish, the fuselage may be made just as the square type was, with the top and bottom cross pieces alike and the formers added afterwards. This is extra work, however, so use the formers as the top cross pieces also, making them wide enough to extend from the outside of one longeron over to the outside of the other. Also let them extend down the depth of the longeron, so the latter fits in a small notch in the bottom corner of the former. After assembly, the lengthwise pieces which hold the covering to shape, called stringers, are fitted into notches previously cut in the former. These notches must be cut so the stringers are reasonably straight from front to rear, this is, the notches should line up so that the stringers are not zigzag shape. One stringer must be placed on the top center of the formers, with an equal number on each side. A total of five is usually sufficient for a fuselage about 18" long. The larger the fuselage, of course, the more are needed. Remember, too many stringers add too much extra weight, while too few will let the paper sag badly, so strike a happy medium.

Some fuselages are rounded on both top and bottom,

(*Continued on page* 40)

A Solid Scale Model of the Dirigible Fighter F.9.C.2

Here Are Plans that Make It Easy for You to Build A Model of One of the Fastest Fighting Planes in Existence

By Wilson Russ

PROBABLY the plane that has created the most comment lately is the new Curtiss F.9.C.2. Fighter. This ship with a wing spread of only 25½ feet, is not only a marvelous piece of engineering work, but it is entirely original in its method of operation from dirigibles as a "mother ship." The fact that it can leave the protecting shelter of the body of the dirigible, fly off to attack the enemy and return to its "Air Hangar" when its job has been completed, fires the imagination to great heights. The new dirigible "Akron" will carry five of these craft within its huge body. Herein a new step in aerial protection has been initiated.

The grace, compact design and construction details drew showers of praise when this plane was exhibited at the recent air show. The new type metal monocoque fuselage is an innovation in pursuit ship design, that will help to assure Uncle Sam of air supremacy.

Equipped with a special device above its wings, it is able to hook on to the "Akron" while in flight. It can then be hauled up into the hull and sent to its storage compartment by means of a monorail. The United States Navy is the first to try this method of carrying ships aboard a dirigible and recent trials have proven it quite practical.

The model of the F.9.C.2., the plans of which are published here, does justice to the big ship in the way of reproduction. It faithfully follows the original. Many plans for models that are published are designed for the builder of average ability and not for the beginner or for the expert. During the construction if you find a certain part too difficult to make, or too easy, change that part to suit your ability.

In order to make the directions less boring and more concise, an outline of the construction in general form is given in steps. A "Special Notes" section describes details to take care of in constructing each part. In this manner you will probably be able to work faster and more surely.

I shall be pleased to offer suggestions to anyone who has difficulty in constructing this ship, if they will write to me at 21 Ann Street, New York City, enclosing a self-addressed envelope with your questions.

The F.9.C.2. model is not difficult to construct and with a little patience, care and skill, a real contest winner can be turned out.

General Directions

THE following steps are called "general directions" because most of the model is built by one method, the Template method, which is the only way to secure an accurate model.

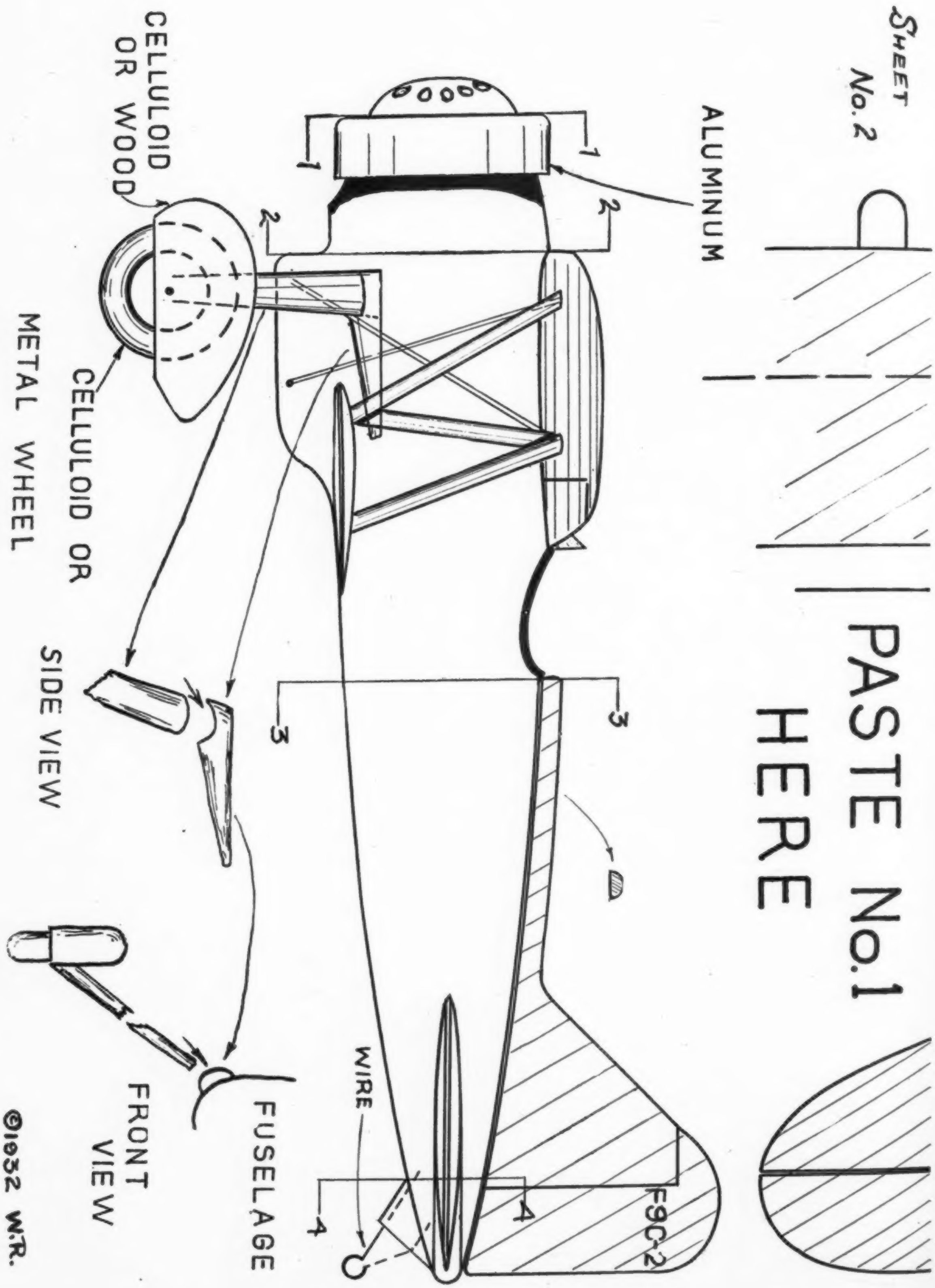
STEP 1—THE TEMPLATE METHOD.

Make a template of the following parts: Top wing, bottom wing, fuselage side, fuselage top, rudder, stabilizer, pants, and propeller, in this manner: Trace the outline of each part on cardboard. Cut out the outlines and you will have templates or patterns of those sections. Be sure to trace accurately. The success of your model depends on this first simple step.

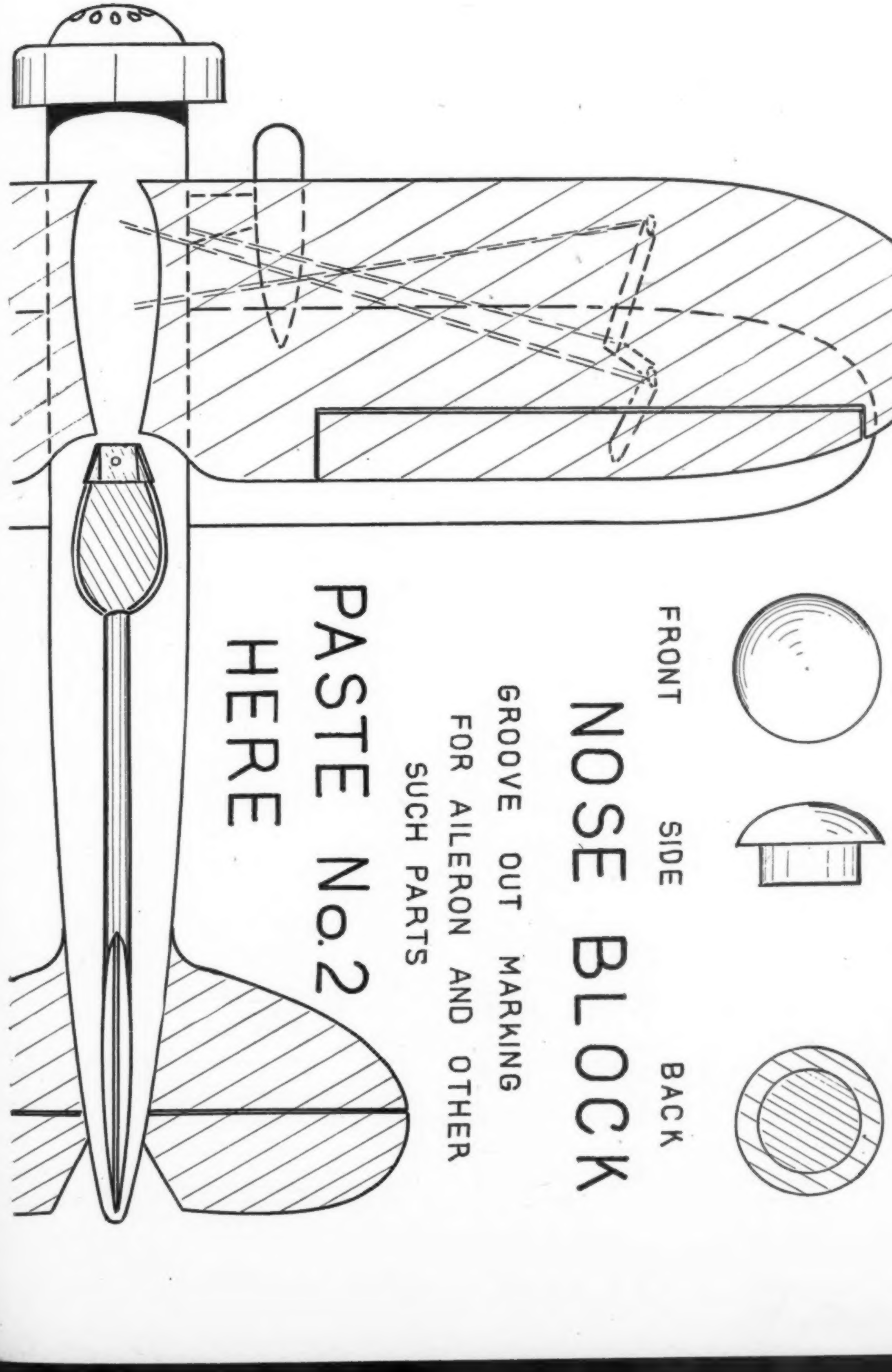
STEP 2—USE OF THE TEMPLATES.

The use of all templates is the same. Lay your template on top of the block of wood selected for that particular part and draw around it with a sharp pencil. When you lift the template off the wood you will have a clear, accurate outline of the part as it was drawn on the plan. Do this on the other side, making sure that both outlines are parallel and directly opposite each other. With a sharp knife shave away the surplus wood outside the outline. In a case like the fuselage, it is necessary to use two templates, one for the top and one (*Continued on page 42*)

Here it is: The Dirigible's "Flying Death." Carried within the dirigible's body to some convenient point, it can be released into flight and then "hook on" to the mother ship again after destroying the enemy. The wing spread is only 25½ ft. and it is said, upon good authority, that it can attain a speed of 250 miles per hour in horizontal flight


SHEET No. 2
PASTE No. 1 HERE
ALUMINUM
CELLULOID OR WOOD
CELLULOID OR METAL WHEEL
SIDE VIEW
FRONT VIEW
FUSELAGE
WIRE
F9C-2
©1932 W.R.

SHEET No. 1


FRONT
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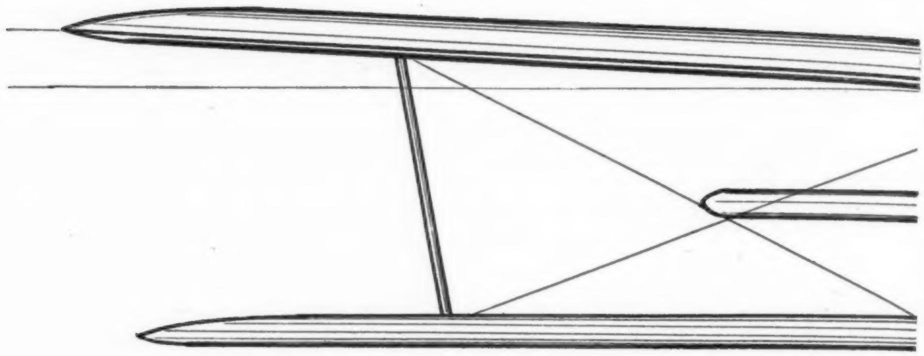
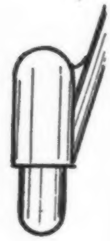
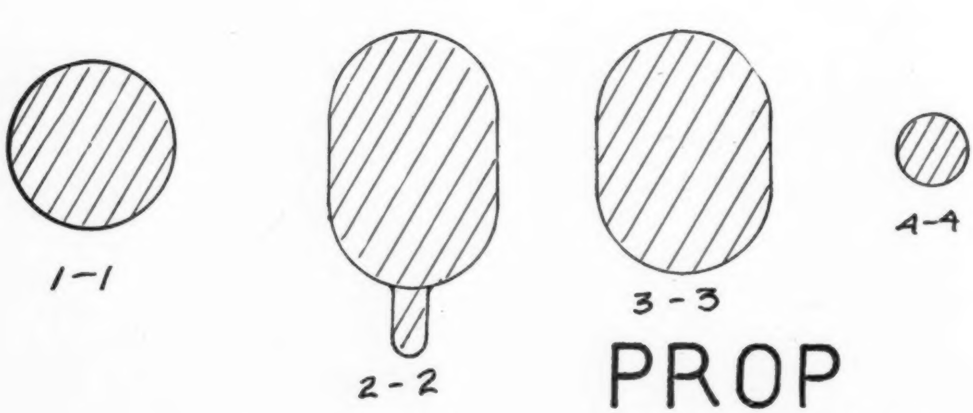
PASTE No. 3 HERE →

SHEET No. 4



FUSELAGE CROSS SECTIONS





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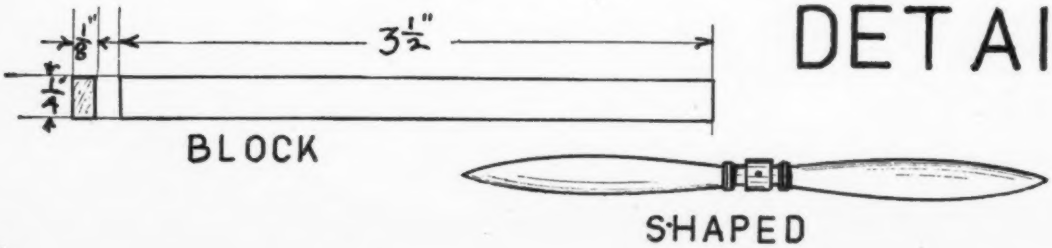
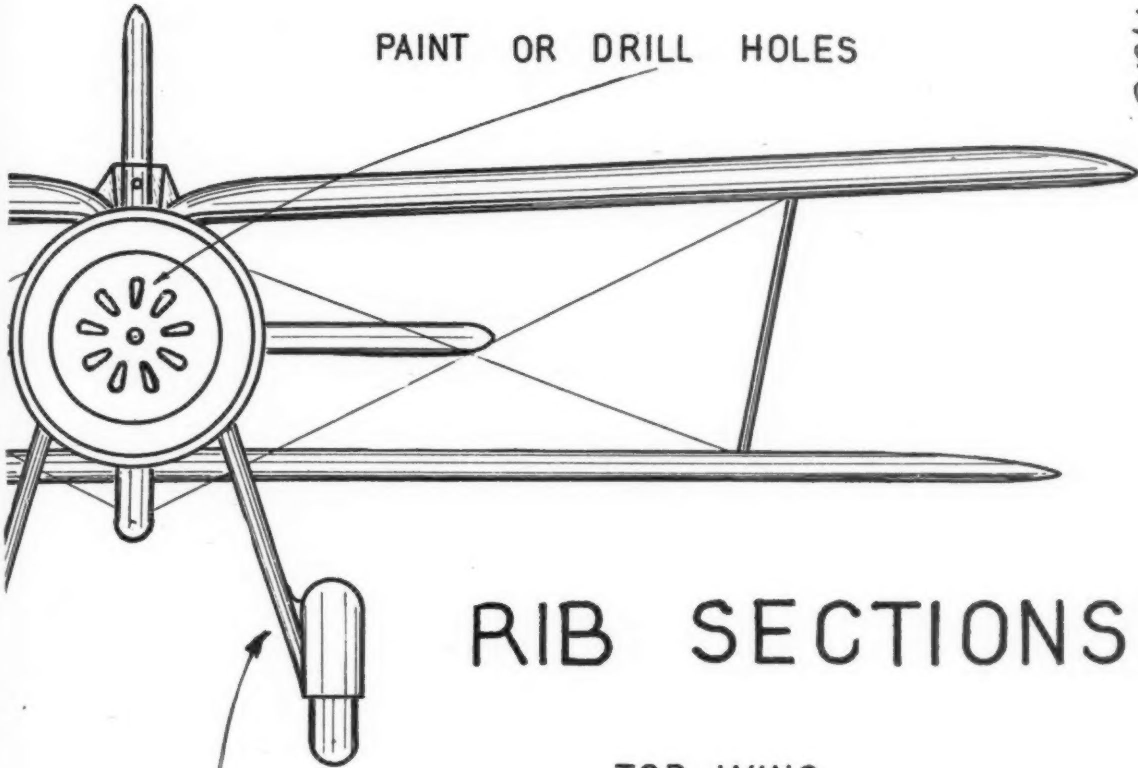


SHEET No. 3

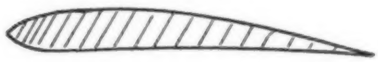
PAINT OR DRILL HOLES



STREAMLINE WITH PLASTER OF PARIS

RIB SECTIONS

TOP WING



BOTTOM WING

PURCHASABLE PARTS

1⅝"	CELLULOID	PANTS
1½"	"	MOTOR
1"	"	WHEELS
3½"	METAL	PROPELLER
1½"	"	DRAG RING

WINDSHIELD

HELPFUL HINTS FOR MODEL BUILDERS

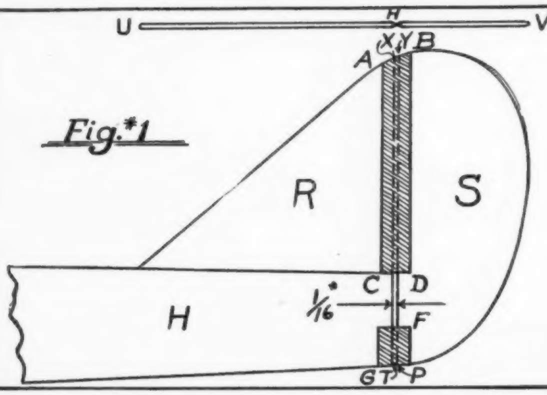


Fig.*1

A Semi-Rigid Rudder Hinge

May be made by attaching Rudder (S) to Fin (R) and body (H) with strips of binding tape (ABCD) and (FG) as shown. Tape should be applied to both sides of the fin and Rudder. A space of 1/16" should be left between the rudder and fin. Crease tape on both sides into this space as shown at (H) in (UV).

C.H. Grant.

Rigid Thread Guy Wires

May be made by inserting pieces of thread (XY) in a holder as shown and dipping thread in a thin solution of dope. After first coat is dry, dip again. Do this until desired thickness and smoothness is obtained. Holder is made by mounting two uprights (AN) and (BN') on a base strip (AB). Parts are held in position with triangles (ADC) and (BC'D') nailed to parts on front and back. Slits (N) and (N') hold the thread.

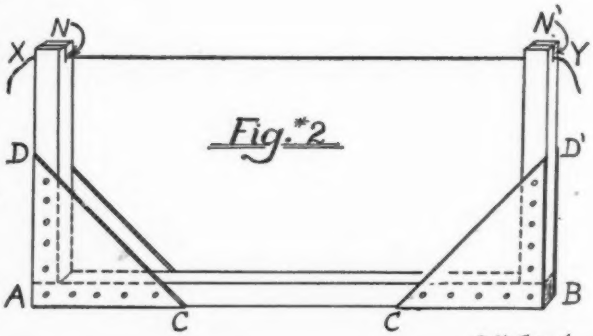


Fig.*2

C.H. Grant.

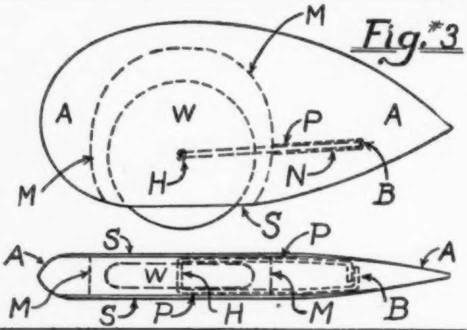


Fig.*3

Spring Axle For Wheels In Pants.

Is easily made by mounting wheels in pants on a wire passing thru the hub at (H) as shown the two ends (P) of which wire are bent at right angles backward, fitting into grooves (N) cut in opposite sides of Balsa pants frame (A). The two ends of the wire are bent inward and are forced into frame at (B). Wire is then cemented in place and pants coverings (S) are cemented on.

Wing Sections For Tapered Wing

Can be simply plotted by method shown in diagram. First draw section (CC), then section (C'C') making measurements of (C'C') half the size of (CC). Divide Chord (CC) into five equal parts by locating points L,A,M,N. Mark point (R) halfway between (C) and (L). Draw lines (RH), (GL), etc. Also other lines as shown. Points (1), (2), (3), (4), are rib locations. Next draw verticals of desired wing section, (BB'), (ZZ'), etc. Then draw curve thru upper points (2), (B'), (Z'), (2'). Draw lower surface curve in like manner. Similar proceedure will give wing sections at other rib points (1), (3), and (4).

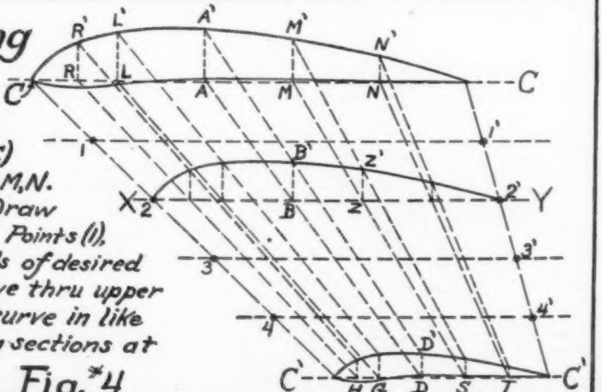


Fig.*4

– C.H. Grant. –

The Man Who Never Came Back

The Story of the "Unpuncturable" René Dorme—the French Ace, Master of Maneuvers, Who Originated the Famous "Wing Slip" in Active Combat

By F. Conde Ott

LES CIGOGNES, the famous flying storks, are regarded as one of the finest organizations of fighting flyers in the history of the Great War. Unquestionably, they were first in the hearts of their countrymen.

To be idolized as a group by a nation was a worthy honor. But what greater glory and achievement to be singled out by the Cigognes themselves as an outstanding member of this valiant group; personally loved and revered as a man, respected, admired and copied as an example of a perfect fighter in aerial combat. Such was the honor of Lieutenant René Dorme, affectionately called "Pere" by his companions because of the gentle, kindly and fatherly qualities that always graced his relations with his fellow warriors of the skies.

There was hardly a soldier, surely not an airman in France, who did not know of and love the gracious René Dorme. With all his gentle qualities as a friend, Dorme was, nevertheless, a bitter, relentless foe, an unerring marksman and, above all, a past master of air tactics. Even so great a flyer as the famed Georges Guynemer called Dorme one of the war's greatest air fighters, surely its finest flyer.

René Dorme was born in Aix-Abancourt, near Verdun, on January 30, 1894. How strange the workings of the fates that the very neighborhood of his birth should later become the scene of, and witness to, some of the most heroic and marvelous sky combats offered in gallant defense of war-torn France, thrilling and deadly combats in which the lovable Dorme was to play a leading part.

LIEUT. RENÉ DORME
who, after downing 23 enemy planes, flew out for combat May 25, 1917, and was never heard of again

—Photograph reprinted from "Heroes of Aviation" (Little, Brown & Co.) by courtesy of the author, Col. Laurence La Tourette Driggs.

Of humble parentage, Dorme was afforded but little education before he commenced his military career at the age of eighteen in Africa with the Seventh Artillery. Recalled to native soil at the outbreak of hostilities in '14, Dorme soon passed into the Air Service—his great wish and hope. His first assignments were with the air defenders of Paris where, in his two seater Caudron, he got but little of the action he was looking for at the fighting front.

But on April 3, 1916, "Pere" was ordered to fly up nearer the battle lines on a short expedition. On the way he ran into a group of six German planes winging toward Paris. What an opportunity, a long looked for event. Dorme hesitated not a moment but with unfaltering purpose dove into the midst of the Boche sextet. The very audacity of his act, the fury and wildness with which he challenged the odds against him, swept the Germans into utter panic and confusion. One ship was already hit and fell flaming to the ground before the battle was really under way. This sudden success of Dorme, despite the advantage the Germans had in numbers, seemed to overwhelm them and they hastily abandoned whatever plans they might have been contemplating and scooted for home.

Captain Brocad, who was commander of the Cigognes at the time, was on the lookout for just such timber for his organization which was just beginning to win its enviable reputation. Dorme was shortly invited to join the Flying Storks. Brocad is to be complimented for his choice and judgment for confidence was perhaps never better rewarded.

It did not take even so brilliant a group as the Cigognes long to recognize the lofty qualities of this new comrade. He won their love and respect in a day. Arriving at the front on July 6, 1916, he immediately went into active service and shortly began registering victories. By the end of the month he already had two official ones charged to his credit, the second of which was a remarkable event, remarkable even there at the front where ordinarily astonishing happenings were merely regarded as commonplace.

On the morning of the 30th, Lt. Dorme had gone aloft seeking battle among the host of Fokkers and Aviatics with which the Germans were scouring the skies. One of the former, cruising within range of the battle-loving Frenchman, immediately drew his attack. The nose of the little Nieuport tilted up as Dorme put his ship into a sharp climb, at the same time circling to the right to cut off any attempt that the Boche might make to elude him and turn tail for home. The calculating "Pere" was ready to claim another victim as he gained his objective and suddenly swooped down from above in a power dive. The guns that always shot so straight and true in his capable hands had just started to work.

But this time the Fokker that Dorme was bent upon destroying was saved — and a strange freak of circumstance it was that spared this particular German. Entirely engrossed in his efforts to deal out the death blow to the Fokker, Dorme was utterly unaware of the second German ship that had been steadily creeping in under his

(Continued on page 44)

AIR—WAYS

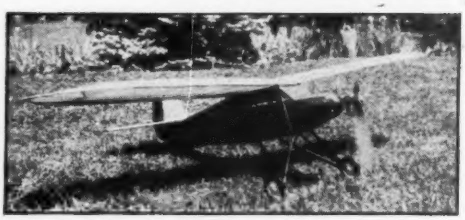
HERE AND THERE

Get Busy and "Air" Your "Ways" of Building and Flying Model Planes. In Each Issue of MODEL AIRPLANE NEWS, Space Will be Devoted to the Activities of Our Readers. Let OTHERS Know What YOU Are Doing

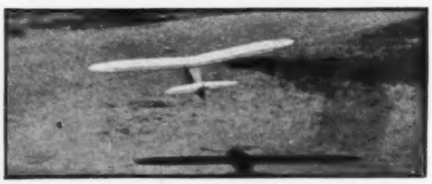
Picture No. 1. Mr. Howard McEntee and his Model Airplane Retriever. Mr. McEntee is the creator of our McEntee Models

THIS month we have a big surprise for you. There have been so many requests from our readers for a picture of Mr. Howard McEntee, one of our model experts who supplies the plans for so many interesting ships in our magazine, that we have taken steps to print one, so if you will look at picture No. 1 you will see Mr. McEntee with his little companion. Mr. McEntee is the one seated in the chair. He needed a great deal of persuasion to contribute pictures of himself as he is very modest. In fact, he has been hiding his light under a bushel in regard to model designing and building, because he has never cared to advertise himself. Those of you who understand human nature will recognize this quality as that of the true artist. Apparently Mr. McEntee is new to the model field because many people have never heard of him, but actually he has been very active in model building for a considerable number of years. In fact, his entire home is filled with models of every description.

Picture No. 2. Mr. McEntee, ready to launch his five foot model

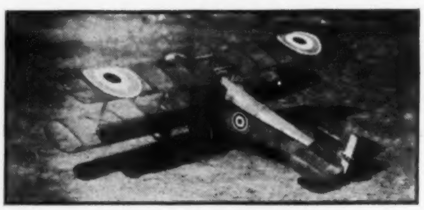


Picture No. 3. The McEntee Compressed Air Model at the start of a flight



Picture No. 4. The McEntee model making a flat glide into a landing

Mr. McEntee himself has provided us with a little surprise this month. For the past few weeks he has been building a Compressed Air Model of 60" span, the plans of which will be published in the magazine some time in the future. Picture No. 2 shows him with this beautiful model which he has tested and flown with great success. Picture No. 3 shows the ship ready for the take-off, with the propeller spinning. Due to the excitement concurrent with the first flights of this machine, it was difficult to snap a photo of it while it was in full flight. However, picture No. 4 shows the plane as it is coming in to a landing. With about one-third maximum air pressure in the tank, this ship flew over 300 feet. As the flying field had more or less restricted areas, Mr. McEntee did not dare to try it out with the full pressure of 250 lbs. We will look forward to hearing more of the flights of this machine when fully tested in the near future.

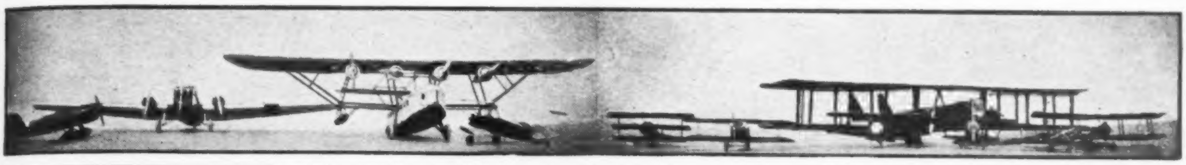


Picture No. 5. Robert Smith's Sopwith Dolphin, at Norwich, Conn.

Picture No. 6. A "dog fight" between a model Fokker, and a Sopwith Snipe, both by Robert Smith

Robert Smith of Norwich, N. Y. has sent us pictures Nos. 5 and 6. No. 5 shows a model of the Sopwith Dolphin with which he has made some remarkable flights. Plans for this machine will be published in the magazine in the near future. Personally, I can vouch for the flying qualities and scale accuracy of this model. Mr. Smith has been a winner in many of the Central New York contests.

A model builder of San Jose, Cal., has sent us an unusual picture, No. 7, of a group of his models. They are Lockheed, Junkers, Sirius G31, Sikorsky, Kellett Autogiro, Albatross, Camel, Spad, Aviatik, Lizenz Bomber. Upon looking at the picture, it is not difficult to im-



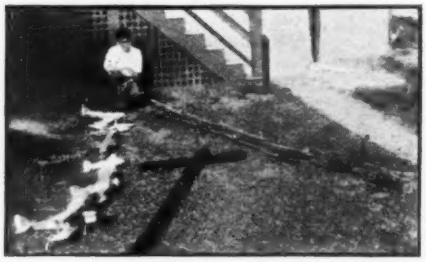
Picture No. 7. This is not a picture of an aerodrome, but merely a collection of mode… by a young man of San Jose, Cal. He does not wish to give his name.

Picture No. 8. A flying low wing model by Alfred Koeppe of Union City, N. J. and Henry Laureys, of Jersey City, N. J.

agine that these ships are lined up on the flying field ready for action. These models are extremely fine and we wish to compliment the builder.

PICTURE No. 8 shows a remarkable flying model built by Alfred Koeppe of Union City, N. J. and Henry Laureys of Jersey City, N. J. This model is a composite design, containing principles of the Supermarine and A-8 Attack. The builders tell us that it has an exceedingly fast climb and flies a considerable distance. The picture of this machine in flight would indicate that its builders are not claiming too much for it. The point to which I would like to draw your attention is that the model is flying in a perfectly level keel, showing excellent stability. You all probably know that stability in a model is a most elusive quality, probably because model builders have failed to understand thoroughly the principles of flying and design.

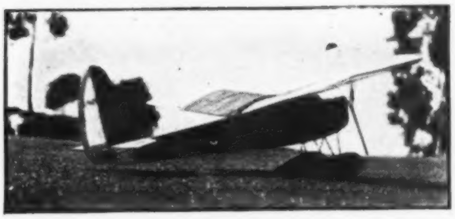
Picture No. 9. An exact scale model of a Waco Taper Wing by Jack Clark, Ft. Thomas, Ky.



Picture No. 10. Renel Conover of Tarrytown, N. Y., and his fleet of twelve scale models

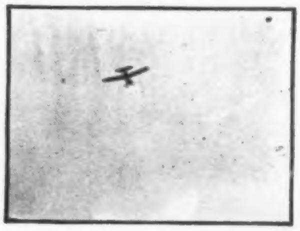
Picture No. 9 shows us a remarkably well built scale model of a Waco Taper Wing by Jack Clark of Ft. Thomas, Ky. Jack is not the same builder who contributed plans in the February issue, although he has the same name. It seems, however, that model airplane building runs in the Clark family. If you will examine the picture of the model closely you will see that it is very difficult to determine whether this is a large ship or merely a model. It might well be standing out on the flying field in front of a hangar with the horizon showing in the distance. This ship has a wing span of 24"; the fuselage is constructed of steel rod as are also the tail surfaces. The wings are made of spruce. The motor is quite a piece of work, containing 223 parts. If patience is a virtue, surely Jack will stand high among the honored ones. Chinese silk has been used to cover all surfaces and has been treated with nitrate dope. Such details as dual controls, throttle, rudder bar, seats, etc., have been carefully worked out. The fuselage is painted red and the wings yellow. Perhaps Jack would be glad to supply readers with further details of this ship, or plans to build it.

E. Renel Conover of Tarrytown, N. Y. sends us picture No. 10 of his fleet of models. This picture is a sample of what a great many young men are doing throughout the country and in years to come a collection of these models should make one of the finest national exhibits in the world. Starting from left in the foreground, the ships are D. H. 4, Boeing Fighter, Howard Racer, Laird Super Solution, Gee Bee, Supermarine S6B, and on the right hand line, starting from the rear, they are Sopwith Camel, Spad, Fokker D7, Albatross D3, S.E.5, and Fokker Triplane. If some of the readers will write to Conover, possibly he can supply some interesting and valuable information concerning these ships and his method of constructing them.



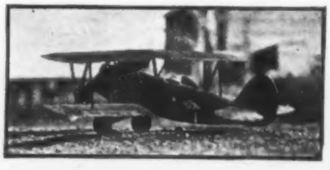
Picture No. 11. Elbert Weathers of Los Angeles, Cal., built this flying model. It is graced with detailed cabin equipment

PICTURE No. 11 shows a neat Cabin Model built by Elbert Weathers of Los Angeles, Cal. This ship is not only a beautiful flyer but also has many built-in details, such as chairs, pilots' seats, dashboard, etc. There can be no doubt as to its ability to fly well for picture No. 12 shows it well off the ground in full flight. The machine has a wing span of 38" with a chord of 5½". The fuselage is 21", stabilizer 13", rudder 6" high, propeller 10" in diameter.



Picture No. 12. Weathers' model in full flight; "And How!"

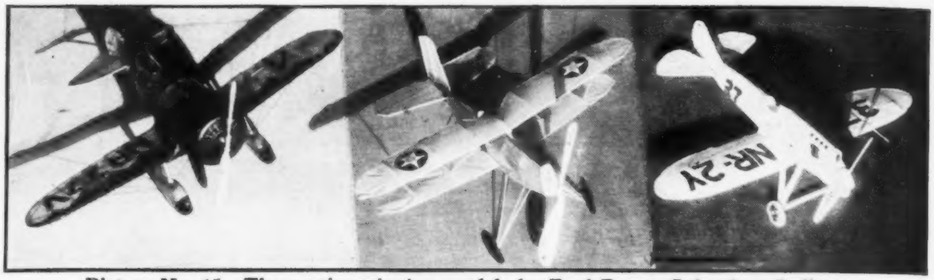
Jack Small of Wapella, Sask., Canada, contributes picture No. 13 of his Great Lakes Trainer. He says this model is built to perfect scale and is a good flyer. He is truthful to say that it is not as stable as it might be. However, this is usually the case with perfect scale models as there is generally insufficient dihedral in the



Picture No. 13. A flying scale "Great Lakes" by Jack Small, Wapella, Sask., Canada

wings to give them proper lateral stability. Jack also sends us picture No. 14 of his machine in flight.

Way out in Columbus, Ind. is a young man named Paul Prout who is a very active and very successful model builder. Recently, at Atlantic City he won first place with three of his scale models; one, a Lowell Bayles Gee Bee Super Sportster, another, Ben Howard's Low Wing Racer, and another, a C. I. Pursuit. These three planes are shown in picture No. 15. They are unusual also in the respect that they will fly nicely. The Gee Bee has a span of 17½", the span of each of the other two being 15". We hope to hear more from Paul.



Picture No. 15. Three prize winning models by Paul Prout, Columbus, Indiana

Picture No. 20. A group of excellent scale models by Peter Letourneau of St. Paul, Minn. Letourneau is an old contributor

From New Britain, Conn., we have received a letter from Frank W. Schade in which he enclosed a picture, No. 16, of a Lockheed Sirius built by Herbert Owen. This machine won first place in a competition at the Essex Airport in Connecticut, on May 30. The judges of this competition were well known men and to win was a considerable honor. The ship is a duplicate of Col. Lindbergh's plane and is complete in all details, such as controls, metal propeller and Pratt & Whitney engine. In fact, Owen has even gone so far as to work out carefully the Pratt & Whitney trade mark on his ship, to say nothing of the hand bags which rest beside the machine, ready to be stowed away in the baggage compartment.

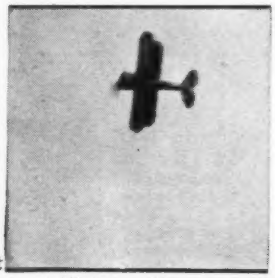
If any of the readers would like to get in touch with Owen, write to him at Mason Drive, New Britain, Conn.

Picture No. 21. Harry Trimble of Ft. Leavenworth, Kansas, and his Polish Fighter, P.6

Picture No. 14. Small's "Great Lakes Trainer" in flight

Picture No. 17. John Alfirevich of Chicago, Ill., and a fleet of fine models he has built

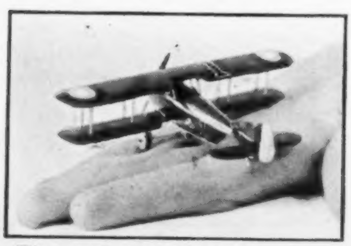
In looking at some of these pictures it is impossible to refrain from harking back to childhood days and wishing for the power of the genii who could wave a wand over some of these remarkable miniatures and cause them to grow to full size planes. It would be very convenient indeed on some of these hot days to hop off in one to explore the more comfortable strata of the upper air. However, this desire, when strong enough, planted in the mind of the young expert model builder, very often miraculously bears fruit in the form of unique full sized ships. One might say it is the stimulus causing the birth of our new designers of the future.



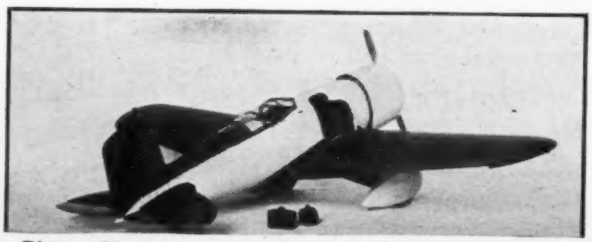
Picture No. 23. A model Laird Racer by Harold Deutsch, Brooklyn, N. Y., makes a steep bank

JOHN ALFIREVITCH, Chicago, Ill., has been kind enough to send us a picture of himself with his fleet of solid scale models, picture No. 17. It will not take the average reader long to decide that this young man is an excellent workman. Though the picture is small, the machines clearly show great detail and accuracy of proportion. John has even gone so far as to build a small model of the "Akron" attached to a mooring mast. Keep up the good work, John, and let us hear from you often.

It seems that our reputation as an aeronautical magazine is slowly but surely extending to countries beyond our immediate borders for we have gained several good friends in Habana, Cuba. Mr. E. Valeio has been kind enough to send us picture No. 18 showing himself and two of his friends seated in an old Curtiss Seagull Flying Boat of which

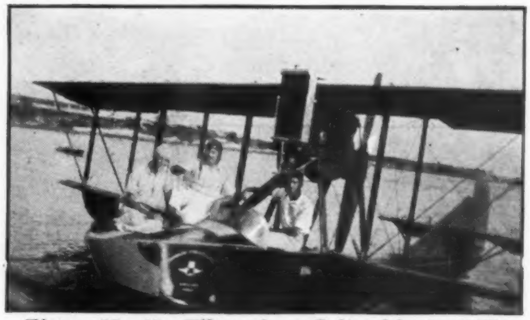


Picture No. 19. A miniature Spad of fine workmanship by A. F. Kitchel, Jr., Andover, Mass.



Picture No. 16. "Here's sump'n." This prize winning Lockheed Sirius, by Herbert Owen, Hartford, Conn., is completely scale, even to the handbags

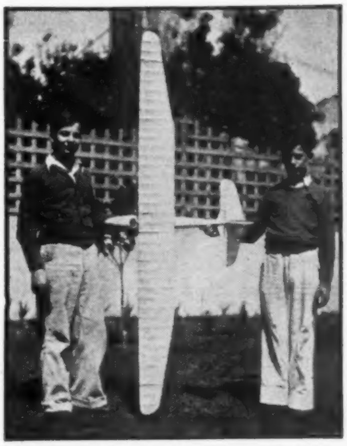
Picture No. 24. A fleet of models by Joseph Miller, Philadelphia, Pa.



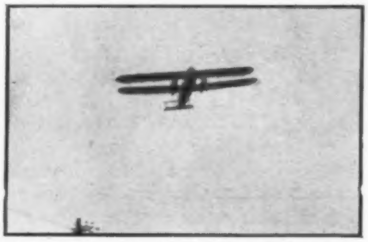
Picture No. 18. Three of our Cuban friends of Habana in their Curtiss Sea Gull. Left to right, Victor Pina, E. Valeio, and F. Barbat. Mr. E. Tabio, another friend, is absent. All are contributors to the magazine "Aviacion"

they make use occasionally. Left to right, they are Victor Pina, E. Valeio and F. Barbat. All of these young men are airplane enthusiasts. We look forward to receiving more news from our Cuban friends.

A. F. Kitchel, Jr., of Andover, Mass., sent us picture No. 19 of a little Spad, one of the most extraordinary little models from a workmanship standpoint that has come into the office. As you can see, the wing spread is hardly as long as the middle finger of the hand upon which it rests. Many young men have built very small ships, even smaller than this one. However, for a model of this size the workmanship is very unusual.



Picture No. 26. A successful (80) inch glider and its builders, John Farneman and Burton Farber, of Los Angeles



Picture No. 29. A Condor model that is a knockout flier, by Geo. Ginn, Columbus, Ohio

Builders Column

An enormous batch of letters has come in to us this month from young men who wish to be listed as builders of model airplanes. Many have sent pictures of their machines, so we are publishing several of the best ones that we have received.

Peter Letourneau of St. Paul, Minn. again honors us with a picture, No. 20, of a few of his models. On the extreme left is a Curtiss Helldiver which he built from the plans in Model Airplane News.

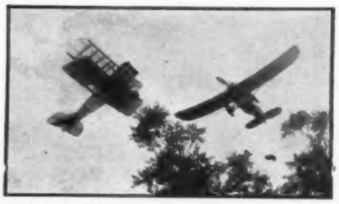
HERE we have picture No. 21 of Harry Trimble and his Polish Fighter P6. Harry is an old contributor and is doing some excellent model work out at Ft. Leavenworth, Kansas. We hope some of our new readers will follow in his footsteps.

Picture No. 22 was contributed by Theodore Baxter of New Bern, N. C. In order to give the planes the appearance of flight he has suspended them from nearby trees. However, I'd hate to be the aviator in a real ship in such a predicament. The foliage would be a little too thick for comfort. One of the ships is a Clark Cabin Model and the other an S.E.5. We thank you, Theodore, for your contribution.

Harold Deutsch, of Brooklyn, N. Y., sends us several pictures of his Laird Super Solution, one of which you will see in picture No. 23. It flies about 200 feet at an average height of 15 feet. In the picture you will see it going full speed, making a steep bank just like one of the old Pulitzer Trophy Race contenders

Picture No. 24 shows a whole fleet of models built by Joseph Miller, of Budinott Street, Philadelphia, Pa., Joseph is one of the few model fans we have in Philadelphia, but he is none the less expert in his model building and flying because of that. Between January 1 and April 1, he built and flew four planes which include the Curtiss A.8 Attack, Curtiss Hawk, a Gull Endurance model, and a Pacific R.O.G. We hope to hear more from this young designer.

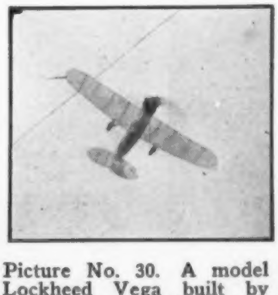
Picture No. 27. The "kid cousin" helps L. W. Perkins, Hamilton, Ontario, to get a photo of his neat looking models



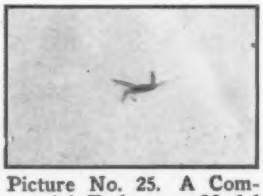
Picture No. 22. Two models by Theodore Baxter, New Bern, N. C., going to roost in a tree

Picture No. 25 was contributed by Harold Mitchell of West Peabody, Mass. He writes and tells us that as he has not seen any pictures in the magazine from Massachusetts, he is introducing

Picture No. 28. John Hill of Columbus, built this fine flying Curtiss Hell-Diver



Picture No. 30. A model Lockheed Vega built by John Malloy, Columbus, Ohio. Some flier



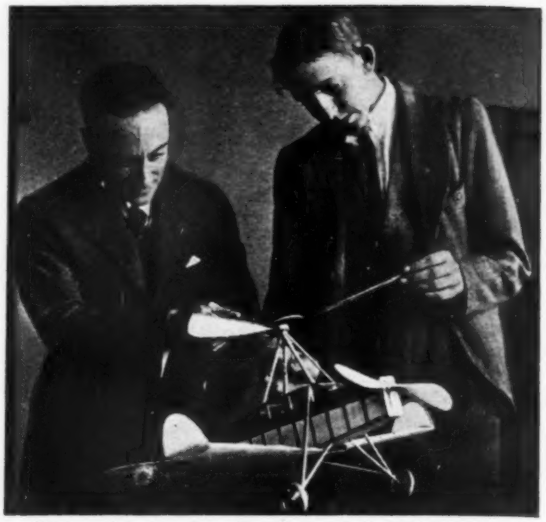
Picture No. 25. A Commercial Endurance Model in flight. By Harold Mitchell, West Peabody, Mass.

MODEL AIRPLANE NEWS to some of the work of a Massachusetts boy. The picture shows his Endurance Plane in flight. It has a wing span of three feet and has flown 2½ minutes. Mitchell has sent us also another picture showing the complete group of his planes which we regret we cannot publish because of the poor photography.

Several of our young men lately have shown a great interest in sailplane construction and some fine flights have been made with this type of machine. One of these ships and its builders are shown in picture No. 26. At the left is John Farneman and at the right Burton W. Farber, both of Los Angeles, Cal. They say this ship has a gliding angle of about 8 to 1, in which statement I believe them to be very conservative, unless the ship has a very poor wing section. Such a machine should glide approximately 15 to 1. It would probably be interesting to the readers to know exactly how the gliding angle of this plane was determined.

L. W. Perkins of Hamilton, Ontario, Canada, has sent into the office some very nice pictures of a Supermarine model which he built from plans in the magazine. We regret extremely that we are unable to publish these because the photographs are out of focus and do not show up the ship to advantage. However, in picture No. 27 which he has also contributed, you will see several of his models which are held by his "kid" cousin, as he puts it. The models are certainly very neat indeed. We hope that Perkins will make another attempt at photographing his Supermarine as we should like to have a good picture of this machine.

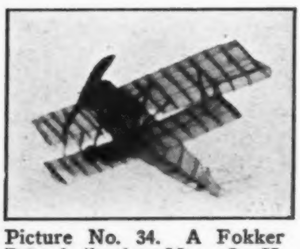
The following is a list of young men and the ships that they have built. We are listing those we have received in the past month and which have not appeared in the magazine previous to this issue.



Picture No. 31. Ivor Freshman, left, makes suggestions to Jim Spence, right. Both of Sydney, Australia

Picture No. 33. The Redwood Eagles Club. Though small, they are active

Picture No. 32. Edward Woolery of Dayton, Ohio, with his Polish P.6 model



Picture No. 34. A Fokker D.7, built by Mrs. J. H. Brown. The ladies seem to be crashing through also

Theodore Baxter, New Bern, N. C., between Jan. 1 and June 1: S.E.5, Monocoupe, Curtiss Falcon, Clark Cabin Monoplane.

Burton W. Farber, Los Angeles, Cal., March: 80" Glider (with John Farneman); February — Curtiss Wright Junior; April— Heath Baby Bullet and Cessna; May—Polish Fighter PZL 1.

John Farneman, Los Angeles, Cal., March: (in collaboration with Burton W. Farber) 80" Glider.

John W. Hawthorne, Fredonia, Pa., Jan. 1 to June 1: Travel Air Mystery, Lockheed Sirius, A.M.L.A. No. 5, Fokker Triplane, Fokker D7, Fokker D8, Lockheed Vega, Gee Bee Super Sportster, Fairchild C.1 Pursuit, S.E. 5-A, Midget, Hell-Diver, 2 models Gee Bee Super Sportster No. 4, What Is It? Lockheed Orion, Laird Super Solution, Fienburg Endurance, Boeing P-12C.

Huefner, Jack, Van Wert, Ohio, April: Fokker Triplane.

Herbert Kanner, New York City, May: Curtiss Army Hawk.

A. L. Kropp, Jr., Meridian, Miss., May: Fairchild Monoplane.

Raymond Lowery, Patterson Springs, N. C.: Jan. 1 to April 1: Travel Air Mystery, Boeing P 12, Hell-diver, Curtiss Condor.

Leo Mulvihill, Brooklyn, N. Y., April 1 to June 3: Fokker, Spad, Howard Racer, Gee Bee, Nieuport, S.E.5, Pfalz.

L. W. Perkins, Hamilton, Ontario, Can., May: Supermarine, Fokker Triplane, D. H. Moth, Camel, Argosy G-EBLF.

Spencer Bostwick, New York City, January—Fledgling, March—Curtiss Hawk; April—Triplane and Texaco 13.

Gilbert Schwartz, Brooklyn, N. Y., May: Curtiss Hawk, Curtiss Wright Junior.

Harold Mitchell, West Peabody, Mass., Jan. to June 3: Small Biplane—March 27; Commercial Pusher—April 7; Seaplane—April 21; Cabin Model—April 20; Commercial Endurance Plane—May 16; Baby R.O.G.—May 19; Twin Pusher—May 26; Twin Pusher—June 3; besides, Spad, Curtiss Robin, and Great Lakes Sport Trainer.

Kenneth Van De Walker, Union, N. Y.: S.E. 5—February-March; Cessna—March-May; Polish Fighter PZL 1—April-May. (Continued on page 39)

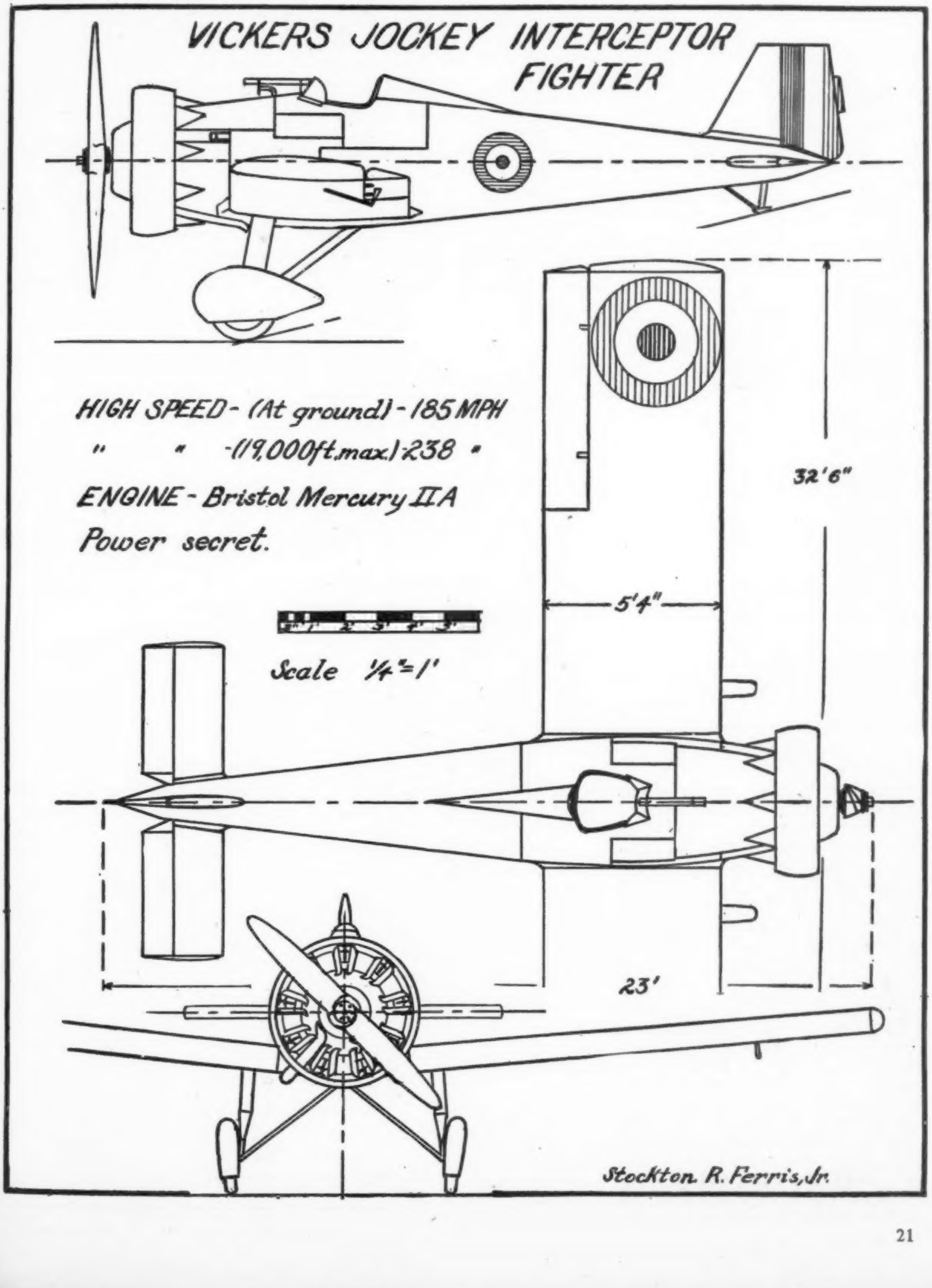
THE VICKERS JOCKEY INTERCEPTOR FIGHTER

This is one of the most recent British interceptors.

It is practically all metal, the fuselage as far back as the rear of the cockpit, and the entire wing surfaces being covered with smooth aluminum. To the rear of the cockpit, the fuselage is fabric covered, and the stringers show.

The machine guns, according to the usual practice, fire through troughs in the fuselage.

The color scheme is all silver, with the regular English cocades, blue—white—red, in the center. Paint the land gear struts, cockpit combing, machine-gun trough, tail skid, etc., black. As the prop is wood, stain it dark walnut, or similar color.



The Aerodynamic Design of The Model Plane

How Does the Area of the Propeller Blades Effect the Performance of Your Model Plane?

By Charles Hampson Grant

Article No. 7

HERE we are back again this month ready to push the frontiers of our knowledge about propeller design, a little further into unexplored territory. Sort of a mysterious place, this land of aeronautical knowledge, and it is one that will produce real treasure for us. That is, if we call treasure being able to design, build and fly model planes successfully. Yes, the facts we discover in these pages may even help you to understand more about large planes, and fit you for a real job in aviation.

In the last instalment of this series of—shall we say, aeronautical discoveries?—we were talking about the amount of propeller blade area necessary to fly our model efficiently. After a combination of mental exercises with geometry and a little algebra on the side, it was decided that the total propeller blade area required to propel the model properly in horizontal flight, when $\frac{P}{D} = 1\frac{1}{2}$ was an amount equal to (3.59) per cent of the total *wing area*. However, we usually want our model to be able to climb. Usually the faster and farther it climbs, the better we like it, for then the more cups and tin medals we might win.

At any rate, if we are designing our machine to have climbing ability, this value for the blade area is not sufficient, for the propeller must then not only overcome the air resistance of the machine, but also overcome the backward pull of the component of gravity. In this case, it is the same with your plane as it is when an automobile has to climb a hill.

The propeller must pull the model up an "air grade."

Now readers, you had better brace your feet for we have to dig our mathematics in order to clinch the following facts. You fellows who think that model airplane design is child's play, are going to have the shock of your lives. From preceding explanations, we have determined that a blade area of (3.6) per cent of the wing area is enough to properly overcome a force equal to 1/10 the lift on the wing. So, for each additional backward drag unit of 1/10 the lift (or 1/10 the weight of the machine), we must have (3.6) per cent of the wing area added to the original (3.6) per cent.

Now, if our plane is to climb at an angle at which it *rises* one foot for every ten that it travels along its flight course, Fig. No. 32, then the drag, represented by line (AB) in triangle (ABC) which is equal to the dotted line (AB) in triangle (AB'H) will be 1/10 the weight of the plane, or 1/10 the lift, as (AB) the drag is 1/10 as long as (AC), the pull of gravity; the rise is one foot in ten feet.

Therefore, as this climbing angle of (1) foot rise in ten feet travel exerts a backward pull due to gravity of 1/10 the lift, we will need (3.6) per cent *more* blade area to have our plane properly designed for this condition alone. The total blade area in this case will be (2) x (3.6)=(7.2) per cent of the wing area. If you wish the model to climb at an angle of 2 feet in 10, or (1 to 5), (3.6) per cent more blade area must be added again. The total blade area would in this case be (10.8) per cent of the wing area, or, (3.6) x 3=(10.8) per cent.

In order to express our angle of climb in degrees, we may start with the known fact that a *rise of 1/16 inch, 4 inches is equal to "one degree"*. A rise of (1) inch in (10) is equal to a rise of 16/16 inches in (10), so,

$$\frac{16}{10} = \frac{x}{4} \text{ or } 6.4 = x = \text{Degrees.}$$

This means that the (1) to (10) climbing angle is equal to a rise of (6.4/16) in (4) or, the angle of climb equals

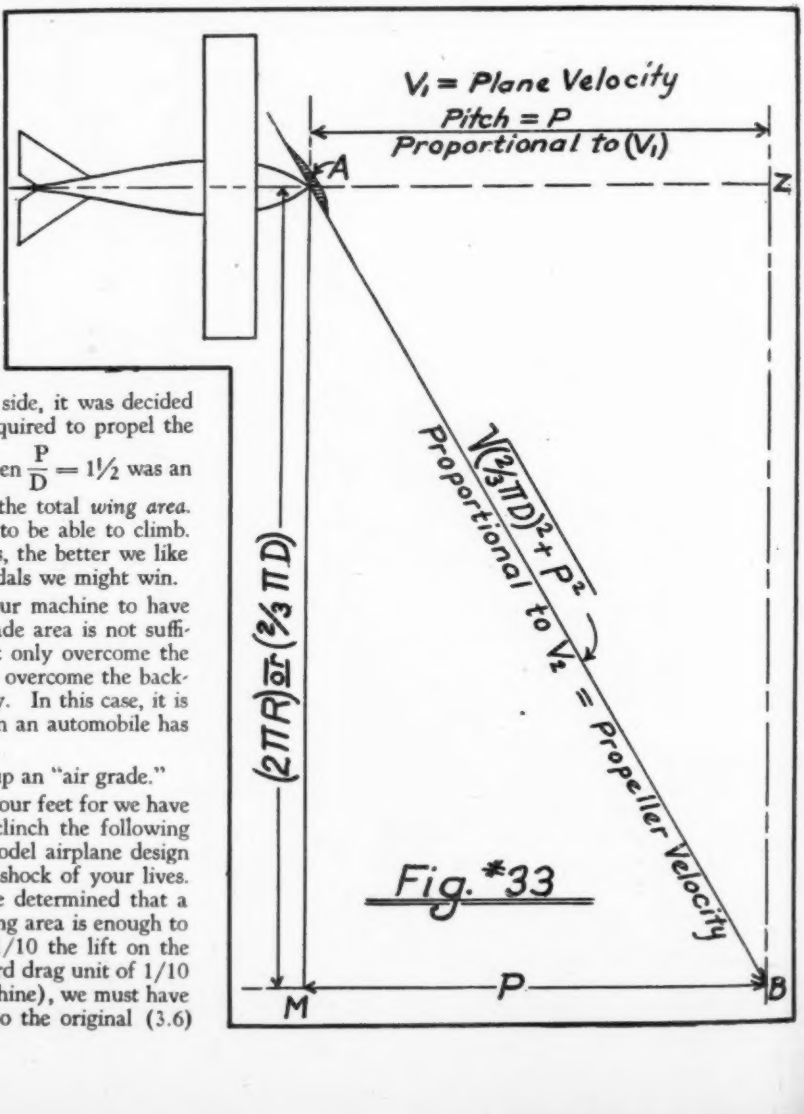


Fig. #33

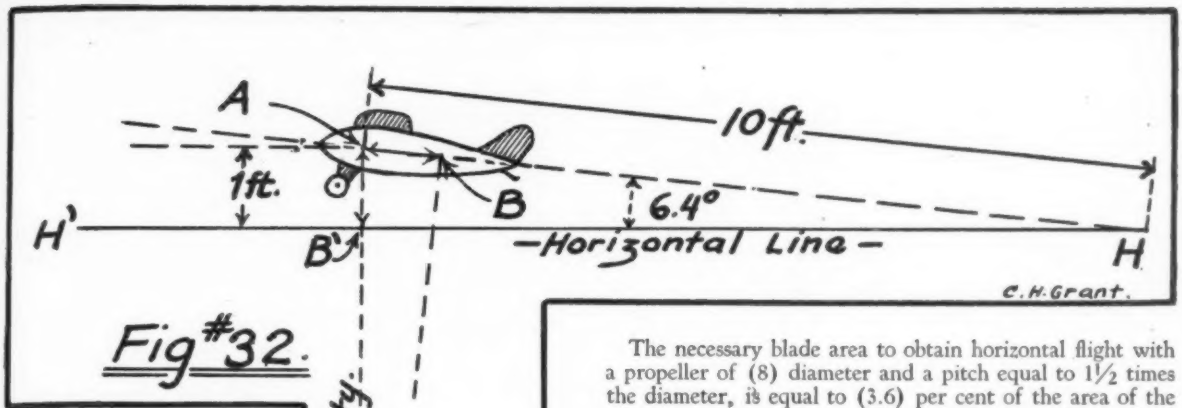


Fig #32.

6.4 degrees. Thus, for every 6.4 degrees angle of climb we need (3.6) per cent of the wing area added to the (3.6) per cent needed for horizontal flight. To find what per cent of wing area we must add to the propeller for each degree of climb, proceed as follows:

$$\frac{3.6}{6.4} = (0.552) \text{ per cent}$$

or (0.552) per cent of the wing area is added to the blade area for every additional degree of climb desired, provided the pitch is 1½ times the diameter as stated in our last month's discussion. However, according to our reasoning up to this point, we have assumed that our propeller blades and wing are to function at the most efficient angle of attack, (i. e. 3 or 4 degrees), when the plane is flying at the maximum angle of climb, and have calculated the blade area accordingly. Under these conditions we will find that, during a greater part of the flight, when the plane is not climbing, but merely flying horizontally, the propeller and wing will be operating at an angle of attack less than that angle at which they are most efficient. This will cause unnecessary inefficiency in horizontal flight. It is best therefore to determine the propeller area necessary in order to have the blades act at the most efficient angle of attack when the plane reaches an angle of climb of about *three fourths its maximum*. By this procedure, the length of the flight will be increased without affecting the maximum climb. Your model will always climb at an angle greater than that at which the blades and wing are acting most efficiently. At the angle of maximum climb, the Angle of Attack of the blades may increase to six or seven degrees without affecting the climbing efficiency.

In view of this fact, we need to give only three-quarters as much area to the propeller blades as we previously calculated to be necessary for climbing. Therefore instead of adding $\frac{(0.552)}{100}$ of the wing area to the blade area, for each degree of desired climb, we add

$$A \times \frac{(0.552)}{100} \times \tfrac{3}{4}, \text{ which equals } (.00414)\ A.$$

This is equivalent to (0.414) per cent of the wing area. We may summarize our findings as follows:

The necessary blade area to obtain horizontal flight with a propeller of (8) diameter and a pitch equal to 1½ times the diameter, is equal to (3.6) per cent of the area of the wing, or wings of the model on which it is to be used, or in formula form,

$$a = \frac{(3.6)\ A}{100}.$$

where (a) = the blade area, and (A) = the wing area. Taking into account the angle of climb,

$$a = \frac{(3.6)\ A + (0.414)\ U}{100}$$

(U) here equals the climbing angle desired, in degrees.

However, will this formula and reasoning hold good for propellers of *all diameters*, provided the pitch is 1½ *times the diameter*.

For instance, suppose we consider a propeller of double the diameter of the one in the example given above, or (16 inches) diameter. The pitch would be 24 inches, or 1½ times the diameter. The model files at the same speed as in the first case where an 8 inch propeller is used. Under these conditions we see that the speed of the large diameter propeller blades through the air is also the same, for an advance forward of 12 inches, the 16 inch propeller blades travel the same distance around as the 8 inch propeller. However, as its diameter is twice as great, only ½ a revolution is required to do this. We can see also that the 16 inch propeller moves 12 inches forward in this ½ revolution, as its pitch is 24", which distance it advances in one complete turn.

Therefore, as the 8" and 16" diameter blades travel through the air at equal speeds and make equal distances forward in a given interval of time, the same amount of blade area is required in both cases. Now we can say that, regardless of what diameter the propeller may be, if the *pitch is 1½ times the diameter*, the approximate amount of blade area necessary for horizontal flight is (3.6) per cent of the wing area. Actually this value is slightly low when propeller and wings operate at the same angle of attack as we shall see later. This is due to the fact that we have calculated the thrust

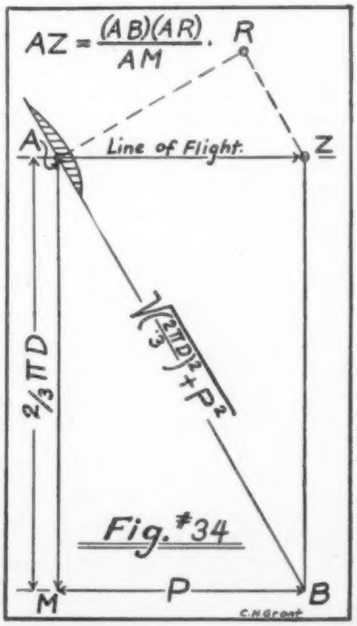


Fig. #34

(*Continued on page* 45)

How To Build A Simple Soaring Glider

Here Is a Little Plane, Cheap and Easy to Build, that will Amaze You with Its Performance

By Robert Loper

THIS is an exceedingly simple, easily built model glider. Combined with a very neat, racy appearance, it possesses astonishing stunting and soaring properties, and requires but little material because of its small size. It is not only an excellent model for a beginner, but one that will intrigue the most expert when he does not feel in the mood to make a more complicated model. As a suggestion to the "expert": these models, made in quantity and well decorated, should sell quite well to children around Christmas, July 4th, and other such times.

Materials Needed

Several sheets of 1/16" medium or hard grade balsa for wing, stabilizer, and fin.

One piece of 3/32" hard balsa for fuselage.

Piece of light steel wire for landing gear.

Small can of quick-drying cement.

A little moulding clay for nose weight.

Construction

The fuselage is formed from the 3/32" piece of balsa, which is first lightly sanded smooth. The piece, which is 6½" long, tapers from a ⅝" depth at the nose to a 7/32" depth at the rear. The nose should be curved around as shown in the drawing, but the rear is left square and will later be cut to fit the curve of the fin.

The fin is made from 1/16" balsa and is sanded to a streamlined shape, thin at the leading and trailing edges and thicker at the middle. The trailing edge may be cut to any smooth curve that will fit in with the correct dimensions. The base of the fin is notched as shown to fit into the notch of the stabilizer. The height of the fin is 2½" and it is 1" at the widest part. The completed fin should be cemented to the top of the fuselage. When the cement is dry, cut the square end of the fuselage to fit the curve of the back of the fin.

The stabilizer is also 1/16" balsa and has the same streamlined section as the fin. It is 5" in span and is 1" wide at the widest part, tapering on each side toward the trailing edge. The circular tips have a 11/32" radius. A notch for the fin is cut in the trailing edge as shown. When it is completed, slide the stabilizer as far back along the fuselage as it will go and cement it in place. It is, of course, at right angles with the fin.

The wing is made of 1/16" balsa, 1½" wide by 14" long. (Note: if a more sturdy model is desired, use 3/32" balsa for the wing. It will be advisable to do this if the glider is to be launched from a rubber catapult, or is to be used for stunting only. It will soar better with the lighter wing, however.) At points 3" from each tip, the trailing edge begins to taper toward the leading edge. The tips are half circles with a radius of ½". The wing section is shown in the drawing. The bottom of the wing is flat while the top is curved with the highest point of the curve closer to the leading edge. Any flat-bottomed aerofoil section will do. The wing is cut in two in the center, the tips are raised ¾", and the two halves are cemented together again. When the cement has dried, cut a slanting notch in the top of the fuselage to give the wing an incidence of about two degrees, and cement the wing in place. The leading edge should be 1¾" back of the nose.

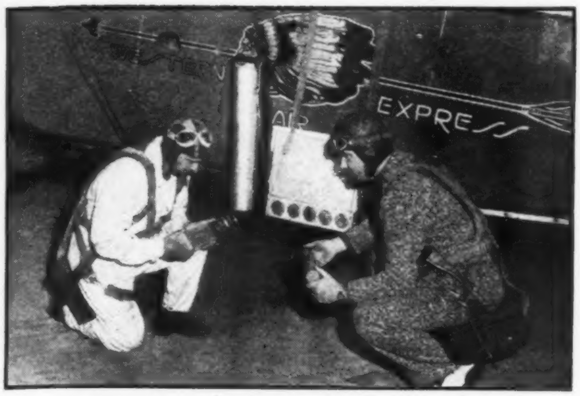
The landing gear is formed from two pieces of light steel wire. The main piece should be formed to the shape shown in the front view, and pushed through the fuselage about an inch back of the nose and cemented. The shorter piece braces the other and passes through the fuselage farther back. A small tail-skid is formed from the wire and cemented in place below the stabilizer.

The wheels may be either balsa or very light celluloid. Celluloid wheels may be purchased at any model supply house, but I would advise the builder to make balsa ones as they are very easy to make. They should have a diameter of between ½" and ¾". A small brass washer should be cemented on each side of the center hole to prevent the wire from cutting into the balsa.

Moulding clay should be used for the weight on the nose, as it is easy to handle and easy to adjust. Experiment until you find the correct amount of clay needed.

THE model can be either hand launched or launched from a rubber catapult. Do not attempt to throw or shoot the glider too hard, however, as the wings may break and fold up. Get in an area where the wind currents are turbulent and up-rising and watch the glider soar and stunt on the currents. At one time, near the corner of a school building, where the wind currents were strong, one of the original models, on a hand launched flight, rose to a height of about seventy-five feet and remained in the air for nearly a minute. By adjusting the weight and changing the manner of launching, the glider can be made to do double and triple loops. Good luck!

EDITOR'S NOTE: In these times of so-called depression, gliders are extremely interesting, as they are comparatively cheap to build. They also have advantages from an experimental point of view for both the beginner and the expert. The beginner finds them very simple to build and may be assured of a reasonable degree of success in his attempts to fly it. The expert may use it to obtain much data of a scientific nature, for instance, gliding angles of various wing sections, the stability of certain wing proportions and combinations, and he may even derive much pleasure from a few minutes of "play" with it. For even Kings cannot be serious all of the time.



ELECTRICALLY OPERATED AIRPLANE FLARES SIMPLIFY LANDINGS

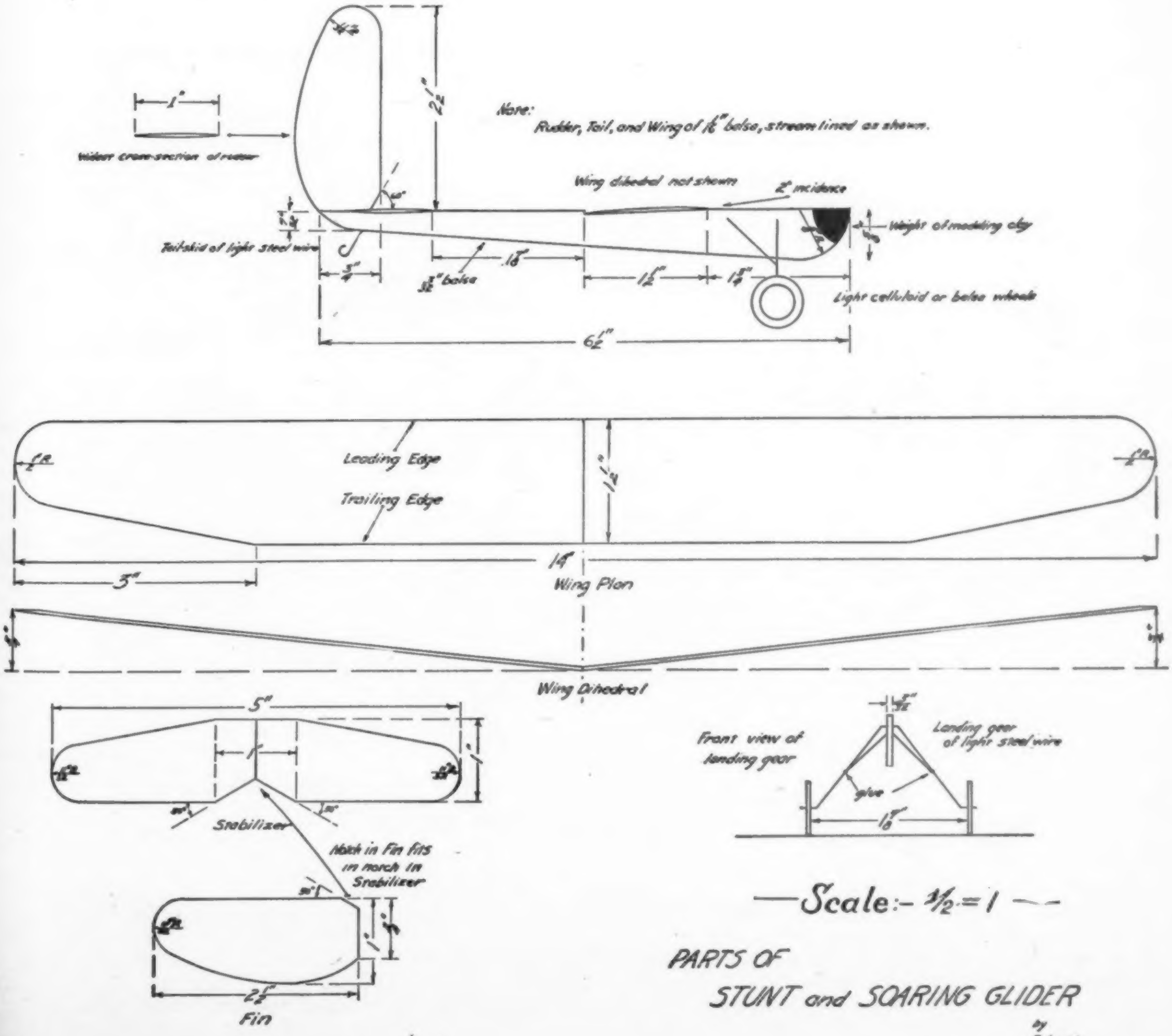
Successful tests have been made with the new electrically operated airplane flares to be used in precautionary landings, in place of the old parachute flares operated by gravity. The flares are projected forty feet from the airplane in a horizontal direction before exploding and illuminating the landscape with the approximate brightness of a full moon over an area of 640 acres.

—Wide World Photos.

YOU CAN'T KEEP A GOOD MAN DOWN

Here's a close-up of Lieut. Commander Hawks in the plane before taking off for his first flight since his crack-up at Worcester, Mass. Plaster adorns his cheek and chin. Just out of a hospital, he turns his attention immediately to things aeronautic, by visiting the Squantum Naval Air Station. It won't be long now before a few more records are broken, and we need not say who will hang them up.

—Wide World Photos.



PARTS OF
STUNT and SOARING GLIDER
by B. Logan

HOW WELL DO YOU KNOW YOUR AIRPLANES?

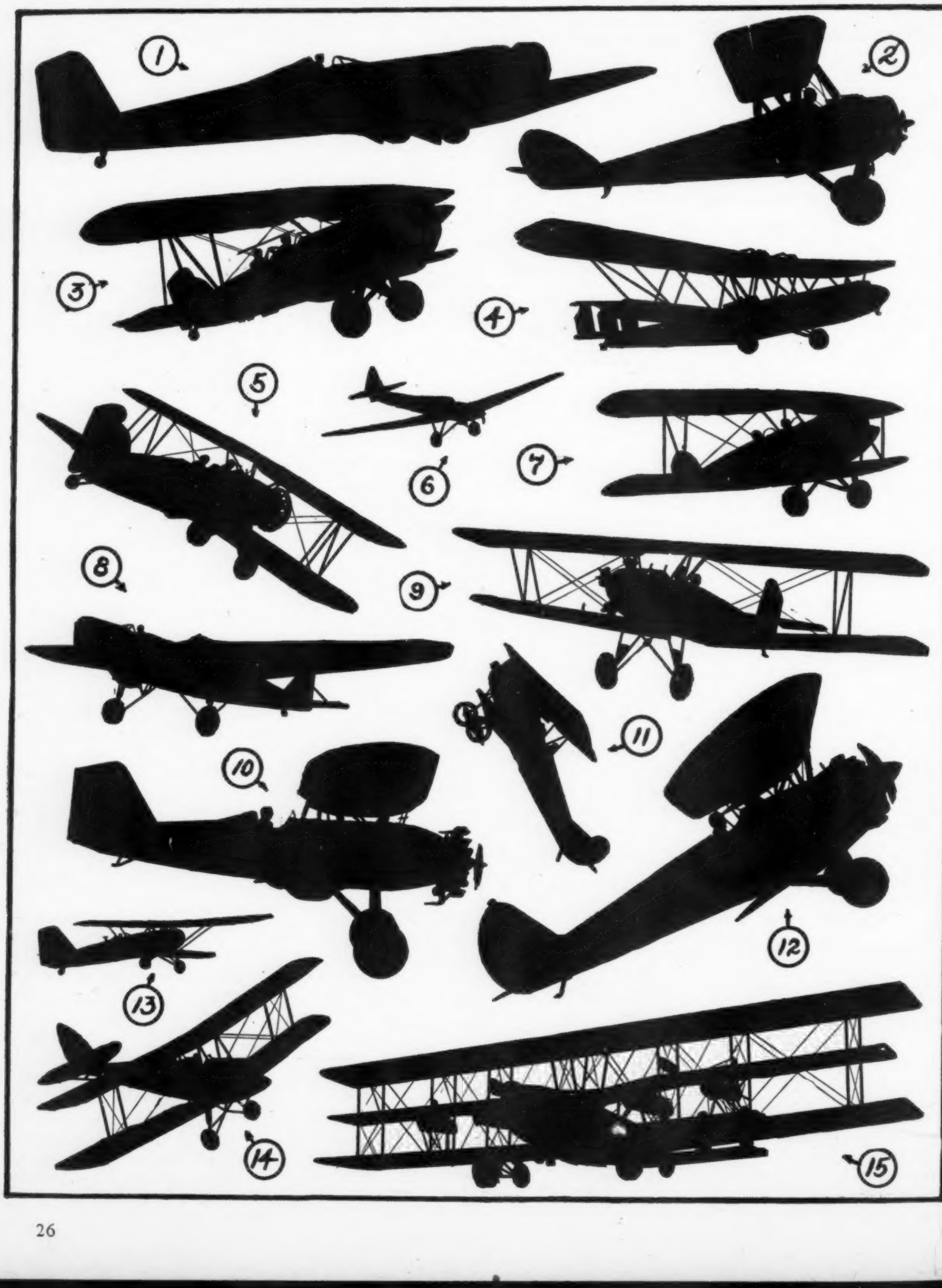
What Are the Names of the Airplanes Silhouetted on This Page?

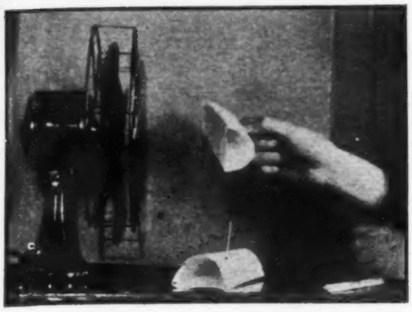
The following awards will be paid by MODEL AIRPLANE NEWS to the persons whose letters, in the opinions of the judges, show the greatest evidence of accuracy, neatness, and attention to detail. The winners will be judged by Mr. H. A. Keller, Editor and Writer; Mr. Charles H. Grant, Editor of MODEL AIRPLANE NEWS, and Mr. Herbert S. Clark, Vice-President of Gray Band Publishing Corp.

Award for First Place, $5.00; award for Second Place, $3.00; award for Third Place, $2.00.

In the event of two or more persons being tied for the first, second or third awards, both persons will be paid the award.

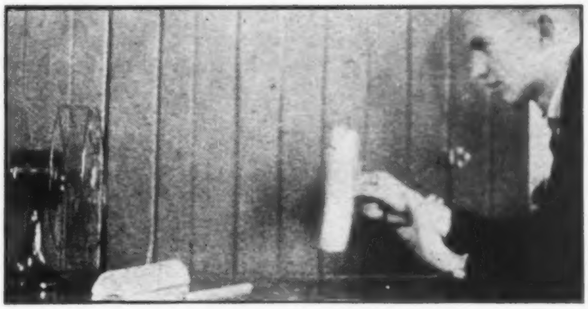
All entries, to be eligible for these awards, must be received not later than August 20th, 1932. Address all answers to Silhouette Award, care MODEL AIRPLANE NEWS, 570 Seventh Avenue, New York City.





Left: The propeller is finished and ready for a trial spin

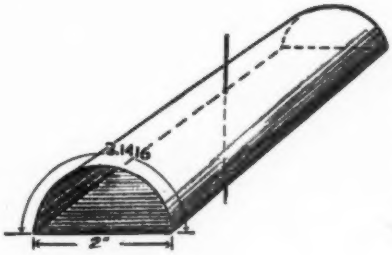
Right: Only a slight push is required to start a few revolutions of your own

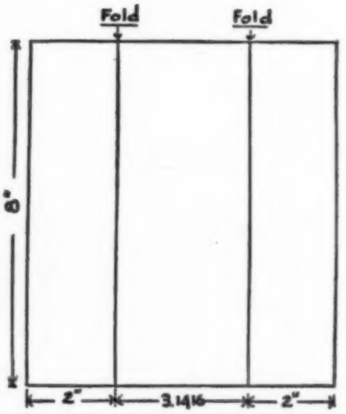


Test This Magic Propeller

Here is Something That Will Puzzle the Keenest Minds With Its Surprising Actions

By Charles Lantz





MOST propellers, as everyone knows, will start revolving by themselves if placed in a strong enough wind, but will go in only one direction unless the breeze is changed to the other side of the blade.

But the magic propeller can be put into the strongest wind, and will never start by itself. But if anyone starts it revolving clockwise, it will continue to spin as long as the breeze continues. Stop it, and start it going in the other direction, and it will spin just as merrily in that direction.

Then let your friends examine the "magic propeller" and try to find out what makes it go. Most of them will have to admit that it must be magic.

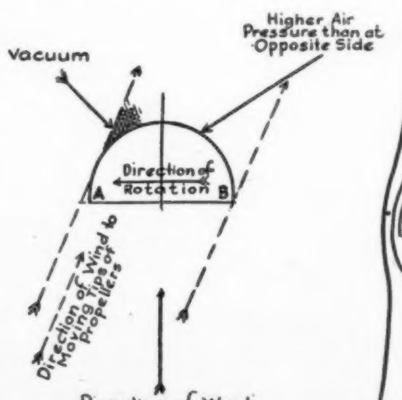
As can be seen in the photographs and diagrams, the propeller, or more strictly, windmill, is very simple. It may be of any length, say about eight inches long, and is balanced on a nail midway between the ends. Its cross section is a semi-circle, with the flat surface facing the breeze when in operation. There is nothing which, to the ordinary eye, would make it spin.

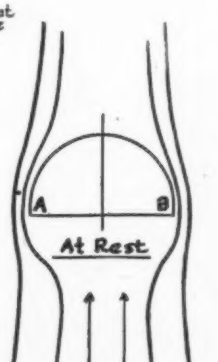
Such a magic windmill can be made of any material. A paper model, which will work very satisfactorily, can be made by anyone from a piece of letterhead or cardboard in a few minutes.

Diagram (1) shows the measurements for a fan two inches across the flat side. The sheet of paper is marked off from one end into 3 strips: the first 2 inches wide, the next 3.1416 inches wide, and the last 2 inches wide. The rest of the sheet is cut off and discarded. The paper is creased along the lines and then the two 2-inch strips are pasted face to face, giving us a tube whose cross-section is a semi-circle, as shown in the diagram. A nail or long needle is used as a shaft, midway between the ends, and in the centers of the flat and curved surfaces.

WHEN the paste is dry, the "magic propeller" is ready for use, and can be tested in any air current, a very convenient one being that from an electric fan. It will then work as described; simply start it in one or the other direction, and it will continue to spin.

An explanation of the propeller is given in the diagram (2). When the propeller is at rest, the effect of air currents are the same on either side, and the blade remains motionless. But when the propeller is started in either direction, the wind, as it strikes either end of the moving blade, is no longer perpendicular to the flat surface, but at an angle as shown by the dotted arrows. A moment's thought of the relative motions will show that this is so. As the air rushes by the edge A (the front edge as it moves), it creates a vacuum, much higher than the small one produced on edge B. The higher air pressure at B drives the blade forward and it continues its motion. In a like manner, a vacuum is produced at B when the propeller is started in the reverse direction. This is due to the fact that at B (Fig.) the air blows across the sharp corner and circles around in back, reducing the vacuum. It is deflected outward at A, because of the curved surface, increasing the vacuum.





Now You Can Build the Famous Nieuport 28

Your Airport Will Not be Complete Without This Flying Scale Model of One of the Greatest Pursuit Ships in the World War

By Howard McEntee

THE little ship we are to build this month is called the Nieuport 28C1. It is French designed and built, but was used by the American forces also. It was the last of the Nieuport ships used in the war and was very successful until the superior Spad 13 was brought out. The ship had a wing span of about 27 feet and the power plant was a 160 H. P. Gnome. The high speed with this power was 123 m.p.h. and the climb was excellent. The 28 was noted for its maneuverability which overshadowed several bad features: the rather weak upper wing and the ease with which the motor caught fire. For all this, it was an outstanding success in its time and the Allies had little trouble fighting any German pursuit ship when flying the 28 until the Fokker D7 came out in 1918.

The ship is believed by many war fliers to be the best-looking fighter of the war, and many of its lines, such as nose cowling and wing shape, are identical with modern types. Our model is very beautiful in line and appearance and is a fine performer. It has been made fairly small, a bit less than 18 inches, which is just about the size of the S E 5 which appeared a few months ago and which was so popular. The design of the large ship has been followed exactly, except for the propeller.

The finished model flashing by the camera

Fuselage

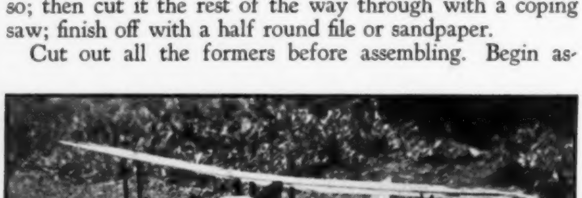
The fuselage is built up of formers with several stringers joining them lengthwise. There are five formers and a nose piece. The outlines of the formers are given in the drawings and may be traced onto 1/16" flat balsa, of which all are made. Have the grain run as indicated on the drawings.

The nose piece is turned from balsa on a fan motor. A lathe may be used if one is available. Start with a block about 2½" x 2½" x 1". The grain may run any way you wish, although from front to back, as the cowl goes on the model, is perhaps the best. The outside is cut down and rough finished with a knife point. Then fine sandpaper finishes the job. The hole through is cut as follows: with the knife point cut in to a depth of ⅛" or so; then cut it the rest of the way through with a coping saw; finish off with a half round file or sandpaper.

Cut out all the formers before assembling. Begin assembly with the two side stringers A, the bottom stringer B and the top one C. With these join the nose piece and formers No. 1 and set aside to dry, being sure the assembly is true and straight. When absolutely dry, the remainder of the formers may be glued in place. The fuselage is of equal diameter from the nose to former No. 1, back of which the taper begins. When all formers are set in place and the rear stringer D put on, the fuselage must be held in proper position until dry. Set it upright on a flat surface with a small weight on stringer B between the nose and former No. 1. Under former No. 3 slip a 1/16" piece of balsa, under No. 4 put a 3/16" piece, and under No. 5 put a ⅜" piece. Let the frame dry with these pieces in place and the fuselage will have the correct shape. When dry the fuselage may be completed. Stringers E are the only others which go the full length of the fuselage. Those shown as F go from former No. 3 to the rear of the fuseslage, while stringers G go from No. 3 to No. 5. There are three pieces which form the rear of the headrest, the top piece and one on each side. The rudder post H of 1/16" x 1/32" bamboo may now be glued in place. The two pieces I, between the nose piece and former No. 2, are of 1/16" x 1/4" balsa and are used to hold the top wing. They pass through lots in former No. 1 and are glued firmly to it and also at each end.

Sandpaper the whole fuselage lightly so the strips are smooth and slightly rounded on the outer edges.

Since the real planes were fabric covered only from the rear of the cockpit back, we shall follow this plan and cover the forward part with thin balsa. The wood should be between 1/32" and 1/64" thick and is used with the grain running front and back. It is put on exactly like paper, except that care must be used to make good joints. Glue is used to fasten it and there are a total of ten pieces. Four pieces cover the section between the nose piece and former No. 1, starting at the top and going down one side halfway with the first piece, and so on around. First



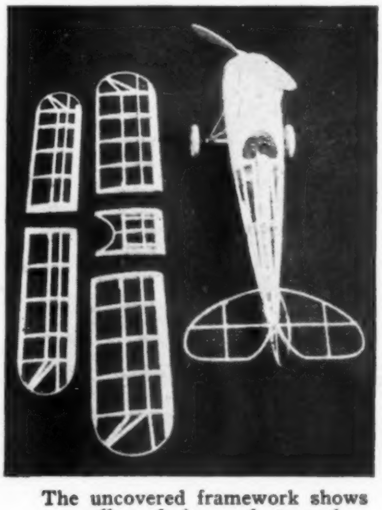
You, too, can have one of these to fly. Get busy

Here it is, ready for a perfect flight

hold the piece in place to find the size, then trim it and glue on. Pins are used to hold the corners and edges down until the glue sets. Any piece which is a little too large may be trimmed with a razor point after the piece is in place. All joints are butt joints, that is, the pieces do not overlap, but the four front pieces should extend 3/4" forward from the rear of the nose piece, this excess material being later trimmed off to form a smooth joint.

Two pieces cover the top half of the fuselage from formers No. 1 to No. 2 and two more from No. 2 to No. 3. The latter two have the cockpit opening cut in them when the glue dries. We now have the upper half of the fuselage all covered, and the rest of the lower half, from No. 1 to No. 3, is covered with two pieces, one to a side. We do not need to bother with No. 2 here, for it only extends down to the middle of the fuselage. When dry, carefully sand down all joints and the nose, cut the cockpit in and the job is finished.

You may, of course, cover the entire fuselage with paper, and omit the wood covering, in which case all stringers must extend all the way to the nose. This is not recommended, however, because the appearance is not nearly as good and the job is not nearly as strong.



The uncovered framework shows excellent design and strength

Landing Gear

THE landing gear Vees are of 1/16" x 3/16" fairly hard balsa, rounded to streamline shape. They pass through slots cut in the wooden covering and are glued directly to the nose piece and former No. 1. It will be easiest to build the Vees on a board first and glue them at the joint. Then when dry they may be easily glued in place on the fuselage. The spreader piece is 1/4" x 1/16" balsa, also streamlined, and the axles of No. 11 music wire bent to the shape shown, are bound on each end. The whole assembly is then glued to the bottom of the Vees. The wheels are 1 3/8" in diameter and if you make them yourself, make the tire part very small as the tires used in war days were little more than motorcycle tires. The tail skid is of 1/32" flat bamboo, cut as shown on Fig. 2. The bottom stringer is slit to hold it and it is glued on well to this and the stringers just above.

Power Plant

As shown on the drawing, former No. 5 has a hole cut in it to hold the rear of the motor stick. The front end is held by a piece (J) of 3/16" balsa, cut as shown on Fig. 3, which has a clip of No. 11 music wire glued to it. This is fastened on the bottom of the hole in the nose. The motor stick is of 1/8" x 1/4" balsa 10 1/4" long and the rear end is cut to fit the hole in former No. 5. A rear hook of No. 11 music wire is bound on. The propeller hanger should be of such height that the shaft will be in the center of the nose piece hole. An extra piece (K) of thin aluminum or brass is bound on the front of the stick to hold the line of propeller thrust slightly downward. The propeller is made of balsa or pine from a block of dimensions shown. Pine is preferable here because we must later add weight to the nose anyway. The shaft is of No. 11 music wire. Three or four strands of 1/8" flat rubber are needed.

Tail Surfaces

The tail is made entirely of bamboo, the outlines being of 3/64" square bamboo. The horizontal tail outline is of two pieces, bent in one and then split. The spar is 1/16" x 1/32" bamboo and the ribs of 1/32" x 1/64". The whole tail is built and glued on a board, then removed as one piece and put on the fuselage. To do this, the three upper stringers are carefully cut and the tail slipped in place, after which all are glued up. The tail has a 0° angle of incidence.

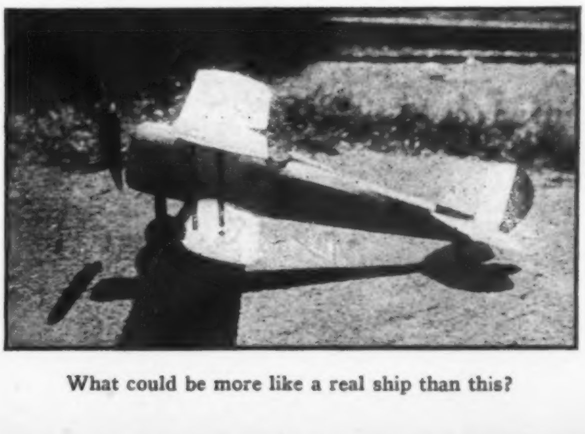
The rudder is built up on the fuselage, the outline being put on first and then the three ribs put in.

Center Section

THE struts are of 1/4" x 1/16" balsa well rounded off and glued to pieces I leaving the upper ends 1/2" longer than necessary, these being cut off when the center section is in place. The center section itself is built up on a board first. It has two No. 1 ribs and one No. 2, and also two pieces (L) 1/8" x 1/16" which hold the strut ends. The front spar M is 1/16" x 5/16" x 2-1/8" and the rear spar is 1/16" x 3/32". The top spar N is 1/16" x 3/32". The large ribs are 1/16" thick and the small center one is 1/32". The rear edge is a 1/16" piece of reed bent to semicircular shape.

When the center section is dry, it should be removed from the board and the wing pins O of No. 11 music wire glued and bound on. These pins should be 3 1/4" long, and for strength they go all the way across the center section. The rear one is glued about 1/32" up from the bottom and on the back of the rear spar. A slot is cut on the under side of M 3/16" back from the front edge to hold the front pin.

The entire center section may (*Continued on page* 38)



What could be more like a real ship than this?

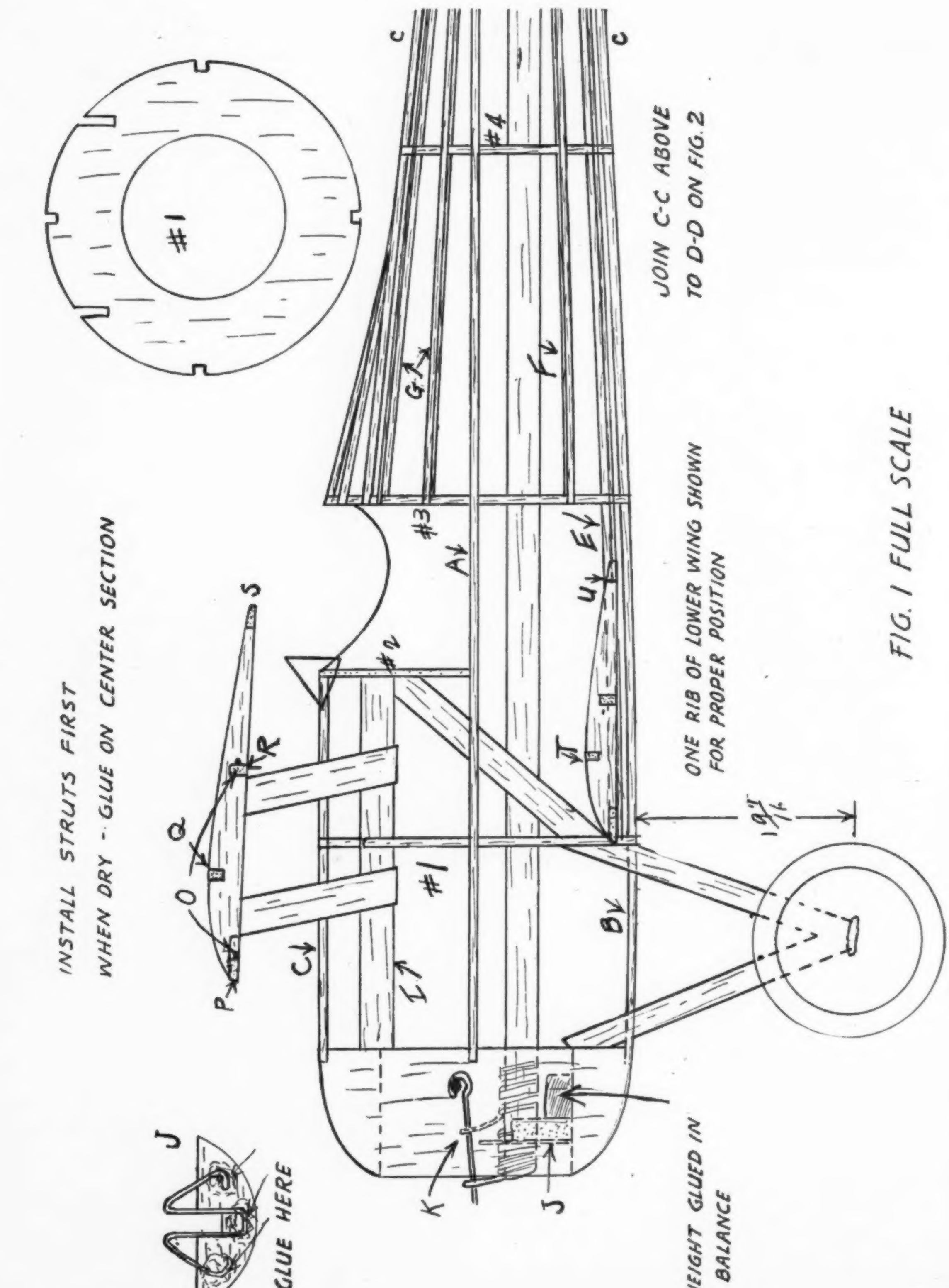


FIG. 1 FULL SCALE

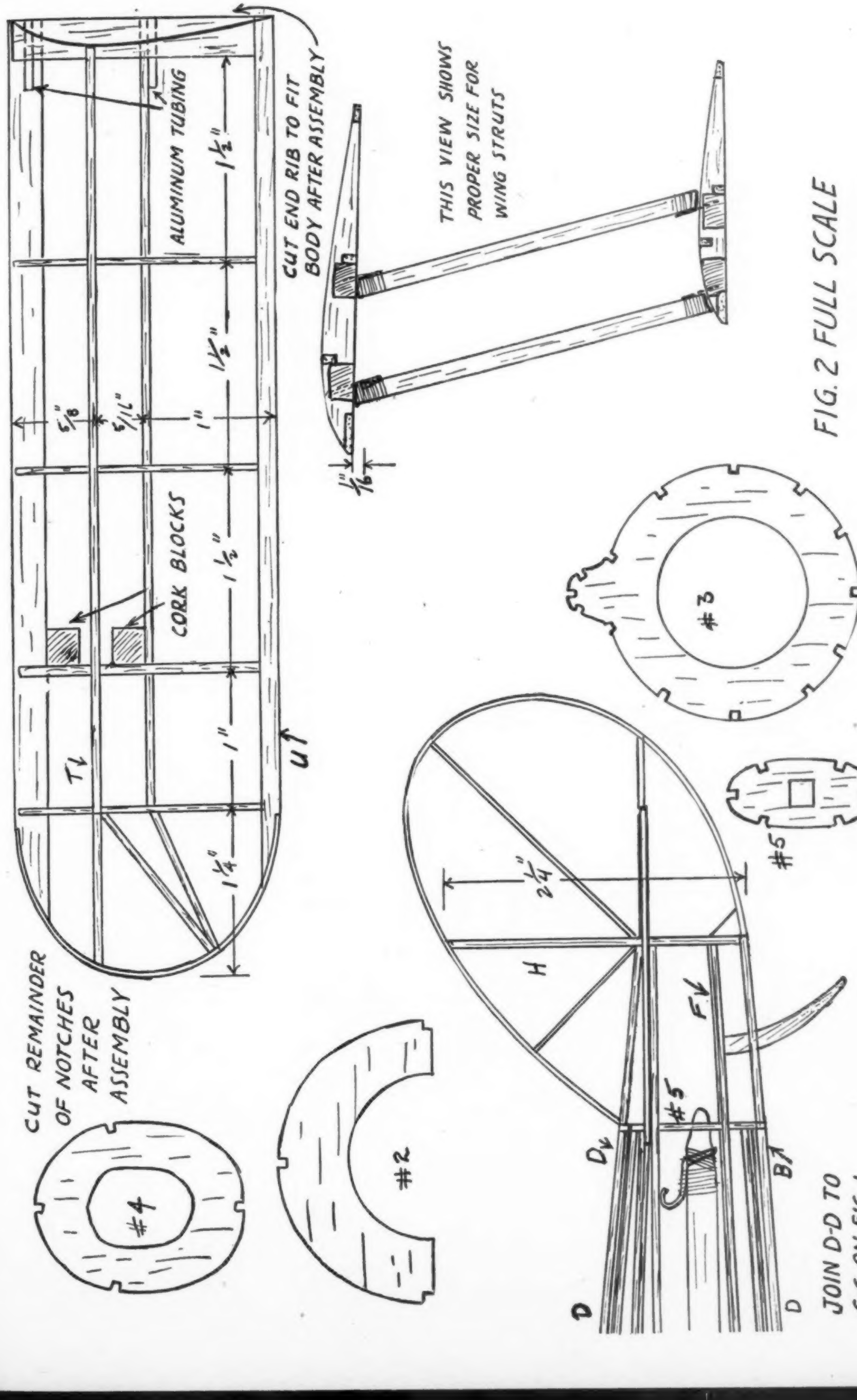


FIG. 2 FULL SCALE

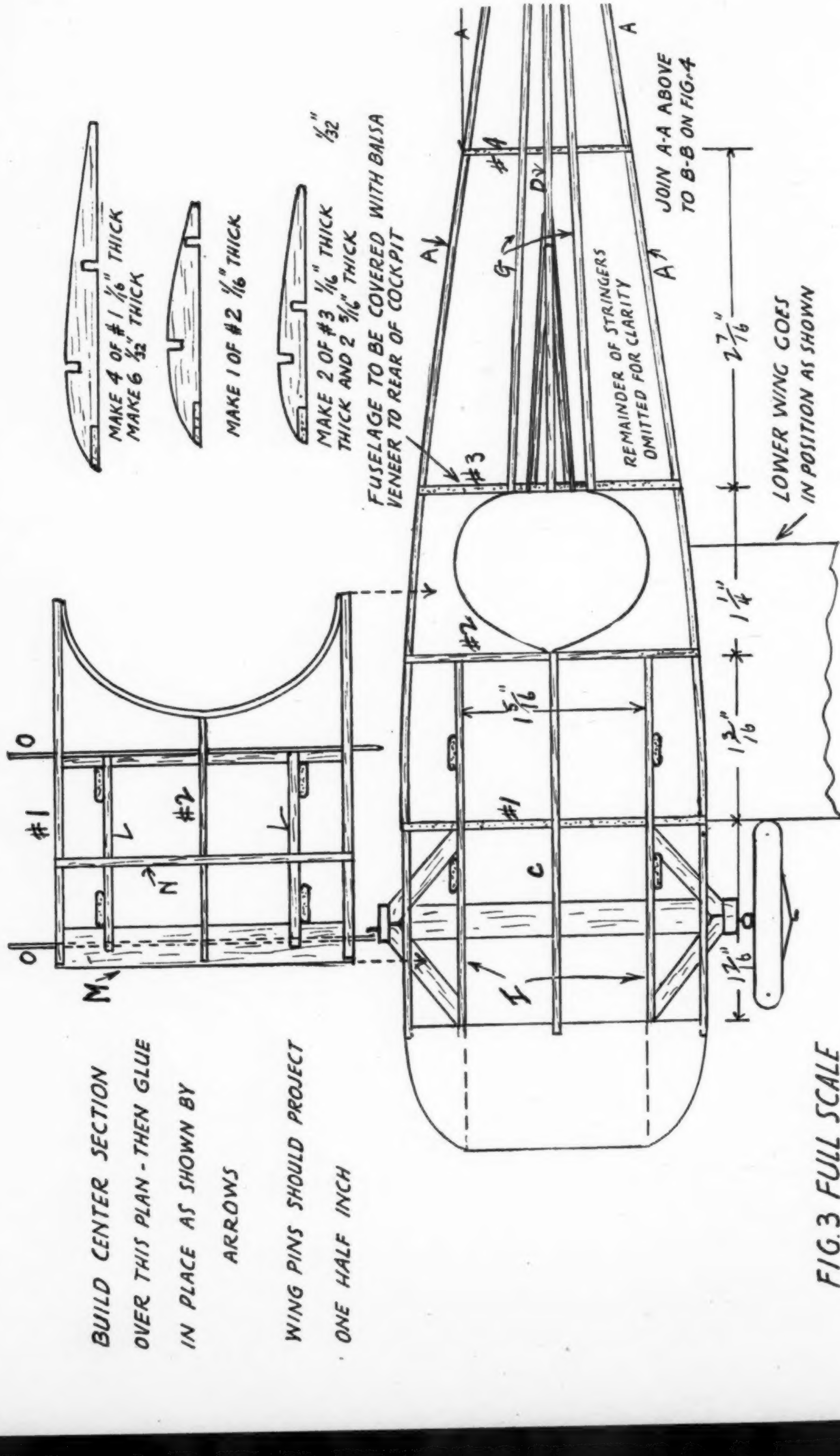
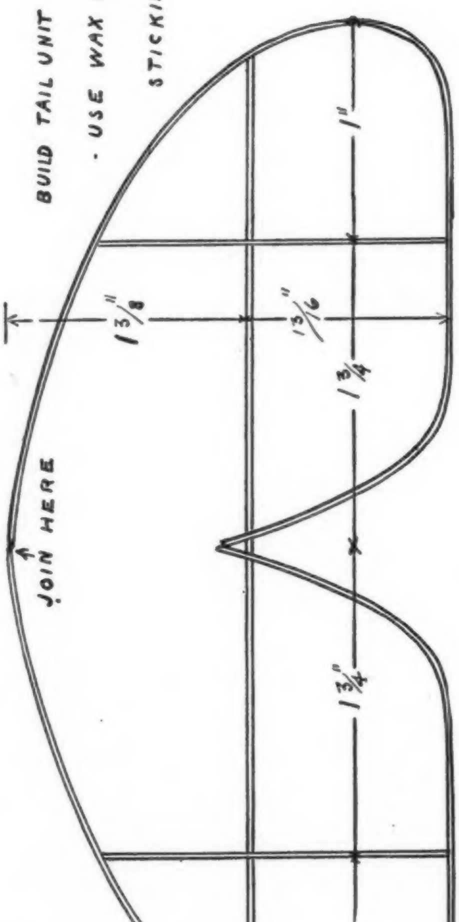
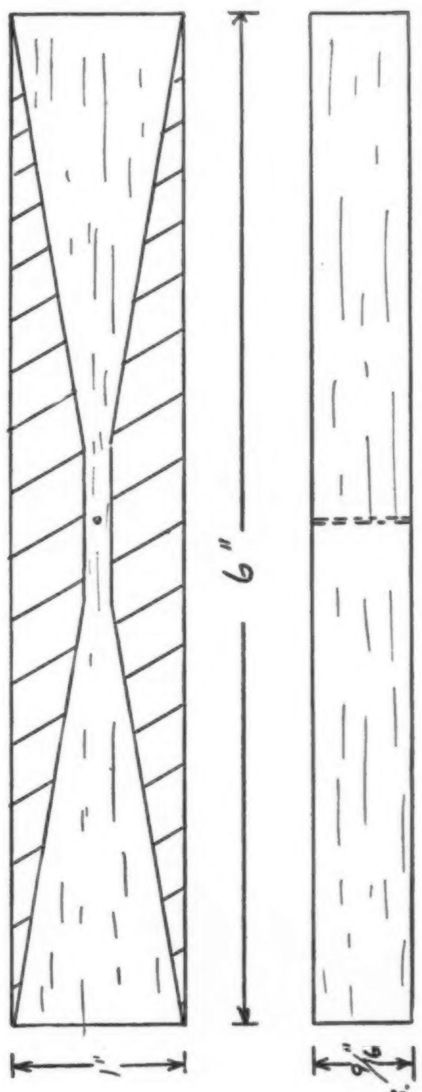


FIG.3 FULL SCALE

BUILD TAIL UNIT OVER THIS DRAWING. USE WAX PAPER TO PREVENT STICKING.



FIRST CUT BLOCK TO SIZE SHOWN - THEN CUT AWAY SHADED PORTIONS AND CARVE OUT.



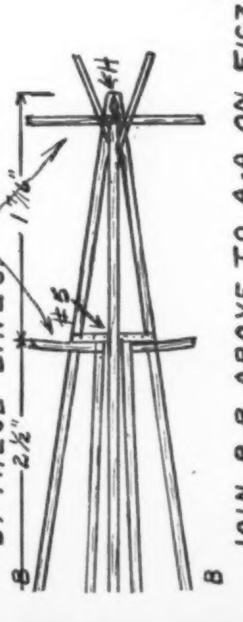


FIG. 4 FULL SCALE

TAIL UNIT FITS ON AS SHOWN BY THESE LINES.

JOIN B-B ABOVE TO A-A ON FIG 3.

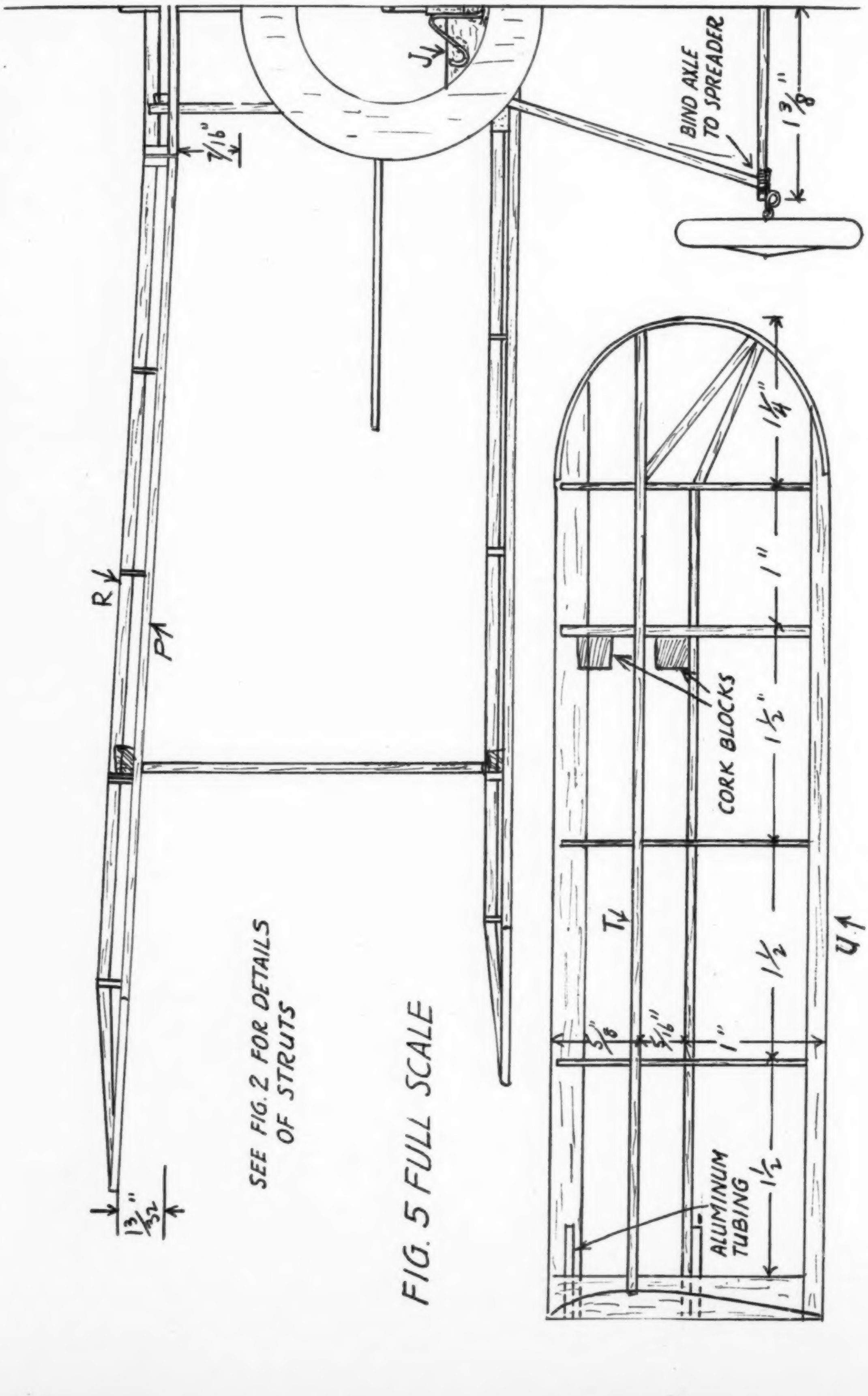


FIG. 5 FULL SCALE

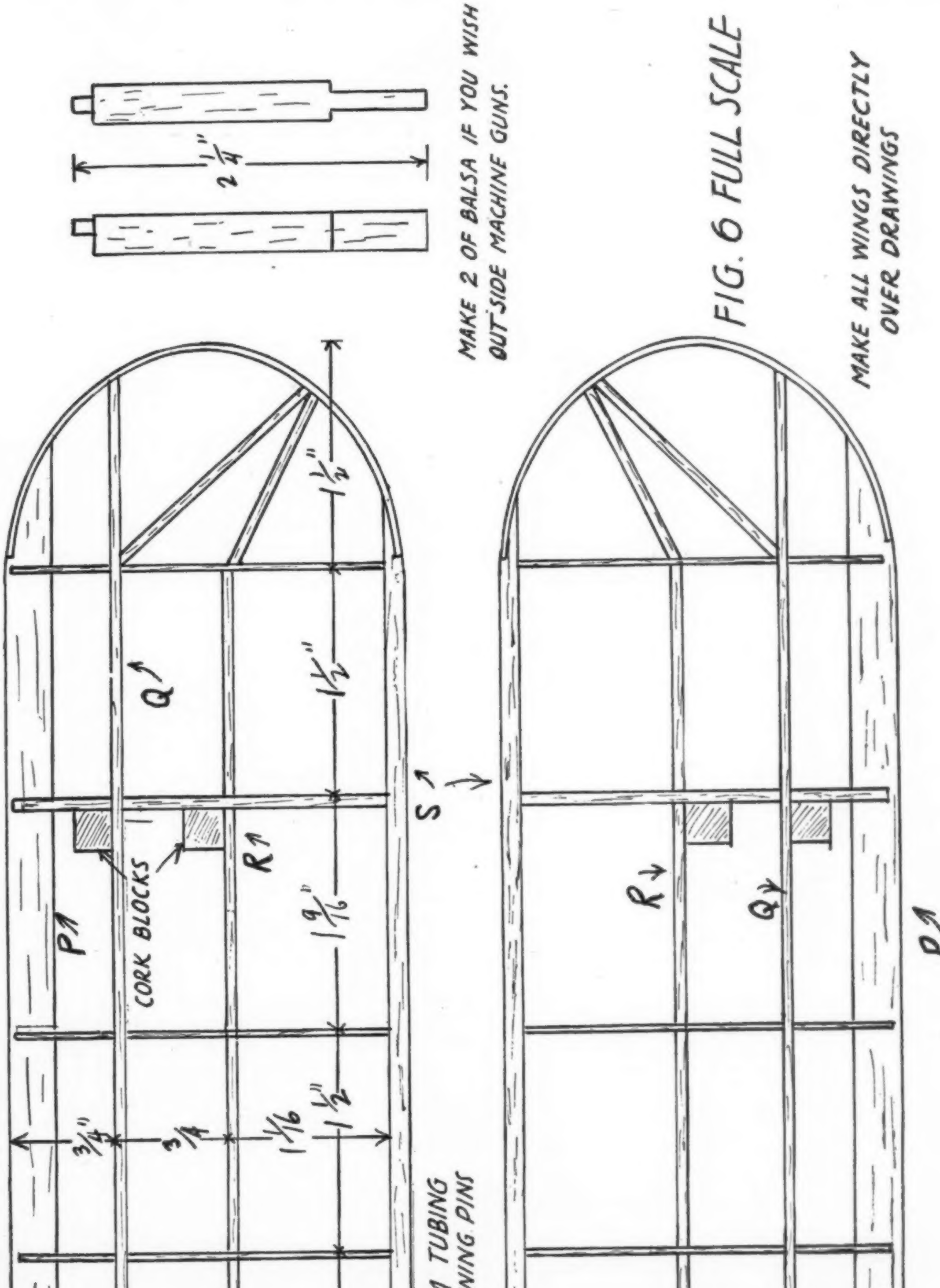
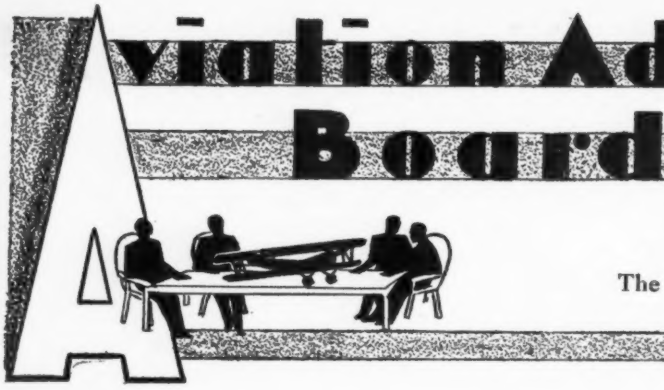


FIG. 6 FULL SCALE

Aviation Advisory Board



Conducted by
CHARLES HAMPSON GRANT
Formerly of
The Technical Section, Air Service, U. S. Army.
Chairman of the Board.

FROM the number of questions that have arrived through the mails this month, one would think that the depression has been broken, at least in the model airplane field. We have had so many that we are going to start right in to answer a few without any preliminaries.

We have two questions from Frederick L. Costa of Hanford, California. The first one is "Are the blades of a regular autogiro set at a negative or positive angle and how does the air turn them in the proper direction?"

The blades of an autogiro are usually set at a negative degree. Approximately one or two degrees negative. It is possible to build an autogiro with the positive setting of the blades but they must be so constructed that the blades seek a negative angle when in flight. Some model autogiros are built in this way with the blades flexible so that they will warp, in order that a negative angle may be produced.

The second part of the question, "how does the air turn them in the proper direction" may be answered in this manner. If the rotor or vanes are to turn counter-clockwise, looking at them from above, the vanes on the left hand side, facing forward, will be moving with the wind or retreating from front to rear. The right hand vanes will be advancing against the wind or in the direction of the line of flight. Now you will notice that the vanes on the left hand side are passing through the air backward, as the machine as a whole, goes forward. On the right, they are passing through the air forward, as an ordinary aerofoil should do. The aerofoil on the left, which is going through the air backward, produces more resistance than the one on the right, moving forward. You can see, therefore, that there is a greater pressure due to the air passing over the left aerofoil than there is on the right side. This unbalanced condition causes the vanes to rotate, the push backward being on the left hand side, where the vanes are retreating or moving from front to rear.

If anyone has further questions about this matter, write to us and we will do our best to make the matter clear.

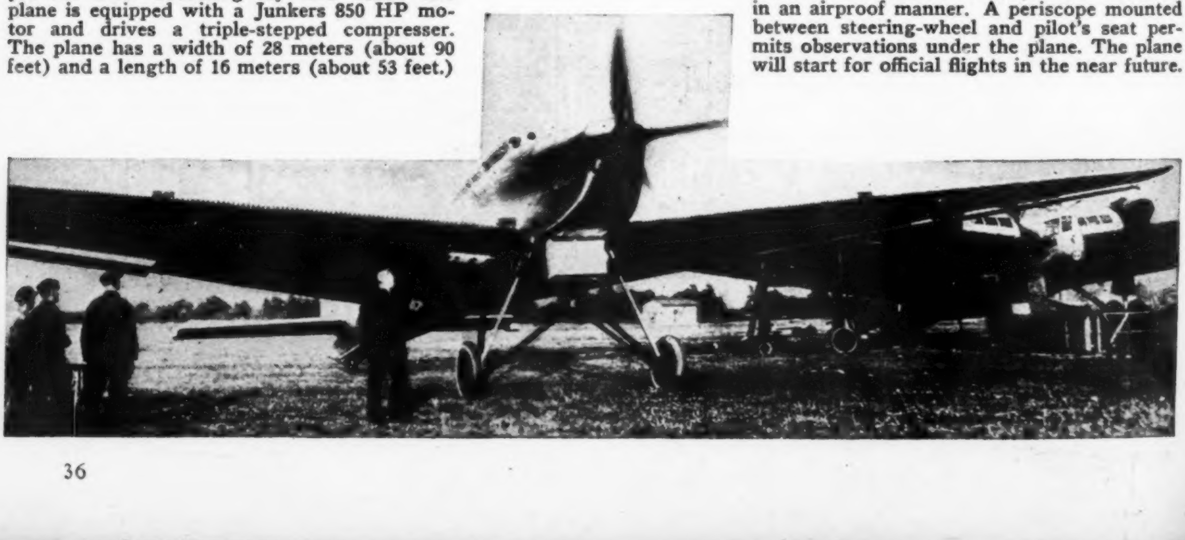
HERE is another very interesting question, "When a plane is diving straight down, with motor on full, will the speed become so great that the propeller causes a drag or does the prop always pull?"

First, I will answer this question in regard to an extreme case, that is, where the machine may dive at a very high speed with practically no resistance. In this case, it is possible for the machine to dive faster than the propeller can pull it, due to the fact that the resistance or friction within the engine would absorb practically all of the power output.

In other words, the motor would have a maximum speed beyond which it is impossible to go. If the machine can dive faster than this maximum motor speed, it is then possible that the propeller would cause resistance rather than a pull. However, from all practical standpoints, such extremes have never been attained in practice. The ordinary ship will not dive fast enough to attain a maximum motor speed. In all practical cases the propeller actually exerts a certain amount of pull while the ship is diving.

Mr. Frank Gregus of Janesville, Wisconsin, writes us and wishes to know what he will need to begin in the model building field. This question is well taken care of in the course on model construction by Howard McEntee, the first instalment of which appears in the July issue of MODEL AIRPLANE NEWS. (*Continued on page* 42)

The high-altitude Junkers plane Ju 49 is equipped with a double-walled, gas-tight chamber for two persons, with round double-paned windows which are heated in order to prevent their becoming icy and dull. The plane is equipped with a Junkers 850 HP motor and drives a triple-stepped compresser. The plane has a width of 28 meters (about 90 feet) and a length of 16 meters (about 53 feet.) It climbs normally to 16,000 meters (53,000 feet) where it reaches a speed of about 500 to 600 kilometers per hour. The entire plane is made of duraluminum. Also the walls of the chamber are made of dural, and are riveted in an airproof manner. A periscope mounted between steering-wheel and pilot's seat permits observations under the plane. The plane will start for official flights in the near future.



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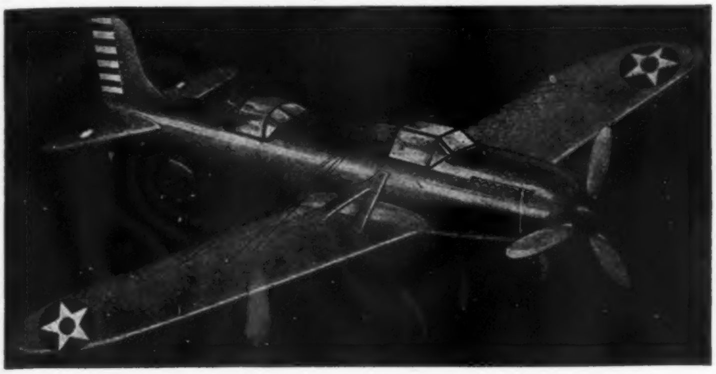

Curtiss A-8 Attack Plane

Ideal-Quality Construction Set

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"THE Secret Terror of the Air," designed as the Army's latest combat ship and the most dangerous fighting plane ever developed! Beautiful, sleek, fast—mounting both contact bombs and machine guns—no wonder the details of this plane are still a closely guarded secret of the War Department.

Here's your chance to build an Ideal-Designed Model of this wonderful ship. This newest Ideal creation duplicates the original in every essential detail. The sleek, streamlined fuselage contour, low wing placement, sensational landing gear streamlining, and every other necessary feature that makes this one of the prettiest Models you ever saw. We have even included the parts for machine guns and a dummy bomb that can be made to explode when released from the Model while it is in the air!

The IDEAL Kit contains everything needed to make and finish the entire Model; bulkhead-type fuselage, built-up wings, shaped wood wheels, a new Ideal-type prop with shaped nosing. All balsa parts have patterns stamped on them ready for you to cut to shape. As usual, IDEAL Kits make building easier. Full size Plans and clear Instructions are also included in this bigger and better value Kit. Send for yours now and be the first to get this A-8 into the air. Complete Kit, fully prepaid, for only $1.10.

This is a special page to bring you our last minute news. See our Regular Advertisement on the Back Cover Containing the Ideal - Designed SUPERMARINE Ideal-O-Craft 6 in. Replica Models Model Accessories at Money Saving Prices

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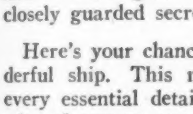
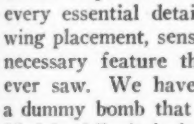
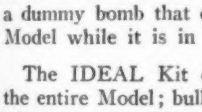


Curtiss A-8 Attack



Tri-Motor Transport



Sikorsky Amphibian

Tri-Motor Transport Curtiss A-8 Attack Sikorsky Amphibian

Here's your chance to carve a 12-inch Model in exact duplicate of its big original. These Replica Models have been so popular in the six-inch size we have now designed three additional ships for 12-inch Models. They are shown at the left. Fuselages are carved from solid balsa blocks; wings, tail assembly and other parts from sheet balsa. Each Kit contains everything needed; you can make them easily and they are wonderfully beautiful when finished.

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Now You Can Build

(*Continued from page 29*)

now be glued to the struts. The front edge should be about 3/32" higher than the rear edge to give the proper angle of incidence.

Wings

The wings should be built directly over the plans, just as the tail and center section were, using wax paper over the drawing. All wing tips are of 1/32" x 3/64" bamboo bent in pairs and then split so both sets will be uniform. The spar sizes are as follows: Top wing, leading edge P, 5/16" x 1/16", top spar Q, 3/32" x 1/16", bottom spar R, 3/32" x 1/16"; trailing edge S, 1/8" x 1/16"; bottom wing leading edge, 1/4" x 1/16"; top spar T, 1/16" square; bottom spar 1/16" square; trailing edge U, 1/8" x 1/16". The bracing pieces at the wing tips are all 1/16" square, and must not be left out as they keep the tip true when the paper tightens up. The ribs of each wing respectively are alike, the top ribs being curve No. 1 and the bottom curve No. 3. The top innermost ribs and all ribs adjacent to struts are 1/16" thick. The bottom inner ribs are 5/16" thick so they may later be cut to follow the fuselage curve. All other ribs are of 1/32" stock.

Small cork blocks 1/4" square and as high as the ribs are glued in the places shown to hold the struts.

The inner ends of the wing spars have 1/2" pieces of 1/16" O. D. aluminum tube glued to them to fit the wing pins, the leading edges having slots cut in them for the purpose.

The pins V which hold the lower wing are glued in their places as shown on Fig. 1, the front pin being glued on back of former No. 1. The rear pin should be fitted so that the lower wings have 0^0 angle of incidence. A balsa piece W is glued to this pin and the three bottom stringers to strengthen them all.

When the wings are all finished, fit them in place with the proper dihedral angle as shown on Fig. 5 and fit in the struts. These are of 1/8" x 1/16" balsa and have pin points bound on each end and projecting 1/4" or so, the pins being stuck in the cork pieces.

Covering and Finishing

The ship is covered with white tissue. The rear of the fuselage is the hardest part but use many small pieces and you will have no wrinkles to mar the work. Cover the tail section and wings on both sides. Spray the whole paper covered part lightly with water and set aside to dry. The wings should be supported on small strips and held with weights so they will not warp.

The original model has a blue fuselage and white wings. All exposed wood parts were rubbed with white paste as a filler before painting. The landing gear, tires, propeller, all struts, and tail skid are black as is the cockpit edge. The wheel centers are blue. All numerals and wing and tail colors are made of colored paper fastened on with banana oil. The upper wings have circles on both top and bottom.

If you would like the looks better, you may put on outside machine guns, but the big ships usually had them inside the cowling.

Flying

The wings are put on with pins so that more dihedral angle may be used for steady flight. About 1/4" more on each wing than shown on Fig. 5 is correct. The wings as shown are set as in the large ship, and the model will fly fairly well that way, but for real flying more angle is needed.

Weight must be added to the nose and may consist of lead solder glued in the nose piece. Add weight until the model glides well, then wind up for a flight. If it stalls, bend the piece K so the prop points down more. Repeat until the model climbs steadily without stalling.

The finished model is a real long distance flyer for its size and it should weigh no more than 1½ ounces. The weight of the original is **1⅛ ounces.**

—o—

Afloat Eight Days

(*Continued from page 5*)

the wings to the fuselage, were made entirely of wood. The struts are peculiar to the Bellanca planes in that they are wider than the conventional lift strut, and act as lifting surfaces just as do the wings—in addition to acting as a structural unit.

The fuselage was constructed of hollow, tubular members of more than one inch internal diameter. These members were thoroughly sealed to prevent corrosion due to moisture.

ACCORDING to Archimedes' principle, which many of us know, a body in water is buoyed up by a force equal to the weight of the volume of water it displaces. For example, a cubic foot of spruce weighs 27 pounds. It will displace 64 pounds of water if totally submerged, but since it only weighs 27 pounds, it will sink until the displaced water is 27 pounds.

The weight of the Bellanca empty was probably in the neighborhood of 2,500 pounds. Assuming that the gas tanks were empty, since Hausner was found not far from land, the weight of the plane as it rested in the water was no doubt near this figure of 2,500 pounds.

We can now calculate the total buoyancy if the plane were totally submerged.

The fuel tanks may be considered the greatest factor in keeping the plane afloat. If they held 500 gallons of gasoline (this value is used for the purpose of our calculations), their cubical content was 500 x 231 cu. in., or about 67 cubic feet. The tanks would support a weight equal to 67 x 64 or almost 4,500 pounds, since a cubic foot of sea water weighs 64 pounds approximately, and about 67 cubic feet are being displaced.

Forty-five hundred pounds would be the buoyancy of the tanks alone whereas the weight of the entire plane is only about 2,500 pounds, so that the tanks alone provide an excess of buoyancy of 2,000 pounds.

IN ADDITION to the tanks, the spars add to the buoyancy by about 500 pounds; the lifting struts probably add another 150 pounds; the tires will also add their share, as well as the tubular structure, and engine. The calculated buoyancy as figured above for certain parts alone is about 5,150 pounds alone. Obviously the buoyancy is more than necessary to keep the plane afloat.

We have seen that the buoyancy is more than sufficient to support the plane on the surface. The next question which naturally arises is "What position will the land plane assume in the water?"

The plane balances at about one or two feet in rear of the leading edge of the wing. Practically all parts of the plane forward of this point are solid so that the excess buoyancy for this portion is therefore very small. The portion of the plane in rear of this "balance" point has excessive additional buoyancy and tends to keep the tail of the plane out of the water and prevents the entire plane from sinking. Only the forward portion of the plane is submerged, so that it is not particularly difficult to get out of the cabin and cling to the tail surfaces.

How long a plane, without the proper floatation gear, may keep afloat is problematical. As long as the sea is moderately calm, the plane will remain intact. That the sea was calm may be accepted from the observation of the rescuing vessel's captain that the derelict was drifting at about 1 knot per hour.

In high seas, the plane will not remain intact very long since it has not been designed for such terrific batterings as heavy seas will cause.

How long a man can survive is largely dependent upon the stamina of the survivor, and there are enough such instances of remarkable rescues when all hope had been abandoned. The rescue of Hausner is one such example.

From our examination of the facts, one can see that the use of a land plane for ocean flights is not necessarily foolhardy. For regularly scheduled flights, however, not "stunt" flights, the use of a seaplane or flying boat is imperative.

Air-Ways

(*Continued from page 20*)

Correspondents Wanted

J. M. Garrett writes all the way from 15 Queentown Road, Onehunga, Auckland, N. Z., and requests me to print his letter in Air Ways. We are unable to do this, however, because of lack of space.

Will some of our readers who are experienced model builders write to Garrett and tell him what we are doing in this country?

Samuel Lewis Mitchell of 104 E. Hackberry Street, Salem, Ind., would like to have some of those correspond with him who have plans for ships which he could use. If some of our readers will write him, it may prove profitable.

We have a letter from Raymond Geibel, 500 So. Boulevard, New York City, who wishes to know if there is a model airplane club in his vicinity which he could join. If this comes to the attention of any member of such a club, will they please correspond with Raymond. He may prove to be an excellent club member.

Another airplane builder who would like to join a model airplane club in his neighborhood is Alan Orthof, 207 W. 106th Street, New York.

Club News

The Columbus Society of Model Engineers, 100 N. High Street, Columbus, Ohio, has been very active. Mr. J. Rentschler, the secretary of the club, writes us as follows:

"Enclosed you will find photographs submitted by members of our organization, taken at various contests and during meets held by the city squadrons.

"Several of the pictures are action pictures taken during contests and two, the Helldiver in flight, Picture No. 28, and the Curtiss Condor Bomber, Picture No. 29, were both taken on their first trial flights. The telephone poles in the background give both shots the appearance of real planes.

"A squadron of eleven Boeings are to be used in local theatres for lobby displays during air picture showings.

"The Lockheed Vega, Picture No. 30, in flight, was snapped in the same location and a few seconds later it was a complete washout due to the high velocity of the wind. This model was built from Model Airplane News plans, the builder said.

"Many of the models were constructed from your magazine plans and our local builders swear by it as the only publication for real model builders. Many of our members obtain their 'News' from club headquarters and for a week the phone rings constantly with members inquiring for their issue. We certainly wish you would set an exact publication date and publish them once a week instead of once a month.

"We have been co-operating with local public and private schools here for over three years in an endeavor to place it in the ('it' meaning model designing and building) public schools as an elective course with regular credits. Our club president, Mr. Konkle, has given a great deal of his time and money in this work and has been going around to the local high schools teaching the school clubs and the instructors and as a result of his work, the Central High School has adopted the work as a regular elective and has over forty students enrolled the last semester."

Model Flying Club of Australia

We hear from Australia again this month with a contribution of Picture No. 31. This shows Jim Spence at the right, and Mr. Ivor Freshman, secretary of the club, examining one of the model autogiros which has been built recently. I am sure members of this club would like to hear from Model Airplane News readers. The address is 375 Kent Street, Sydney, Australia.

National Advance Model Engineers

From Dayton comes word from Mr. D. F. Chase, national director of the N. A. M. E. He tells us of some very interesting facts concerning Edward Woolery of Chapter 1, Dayton, Ohio, who is one of their outstanding members:

"Woolery, who is a member of the Third Pursuit Squadron of that club, now holds six Dayton records and one National record in addition to the very outstanding work he is doing on flying scale models. Picture No. 32 shows him with a model of the Polish P-6 with which he won first place in a recent hobby contest held in Dayton and his latest achievement is the building of a Supermarine S-6 which was so accurately detailed that a photo of

(*Continued on page 41*)

What's and What Nots

(*Continued from page 7*)

in which case the sides are again made as originally described. In this case, however, when the assembling is done, the fuselage is built on its side, a good way being to leave the last made side stuck on your board until the other side is fastened on. Start by gluing the two widest top and corresponding bottom formers in their places and sticking straight up. When the glue has set somewhat, apply glue to the top ends and lay on the upper side, truing up and bracing with cans or bottles as described before, until the work dries. Then cut it off the board and glue in the rest of the formers. A fuselage of this type was used on the Polish fighter described in MODEL AIRPLANE NEWS several months ago.

IF AN oval fuselage is needed, one of the type just described above, with formers and stringers added to each side may be used. However, a better method will be given. Instead of building a square fuselage and adding the formers to give an oval shape, the formers are made all in one piece, for each station. There are no distinct longerons, but all the stringers serve this purpose, so there are no sides to build first. We start assembly with the two largest formers, which are always near the front. In cases where a nose block shaped like an N. A. C. A. cowling is used, this block and the next former to the rear may be used to start construction on. Join the two together with four stringers, the two farthest out on each side and the top and bottom pieces. Before starting assembly, lay the four stringers to be used together on the plan and mark on all with a pencil the exact position at which all the formers will be fastened, these marks being your guides in assembly. Cement must of course be put in all the slots of the formers before assembly. When assembled this far, let the glue set slightly, then straighten the fuselage out so that all stringers are parallel and also be sure the formers are parallel with each other. Let this much dry thoroughly before proceeding further.

When completely dry, glue in the rest of the formers to the four original stringers. On your drawings, make a line on the side view of the fuselage which just touches the lowest point and which is parallel with the center line or with the rubber motor. Next measure up vertically from the line you have drawn to the bottom of each former. Place the fuselage in flying position on a board and lay a weight on the lower stringer to hold it so, then with small scraps of balsa block up each former to its respective height as previously measured and let the assembly dry thoroughly. In this way the complete fuselage will have the proper shape. After the original four stringers have dried in, the remaining stringers may be glued in the notches, after which block the fuselage up again as before and let it dry well. A fuselage built this way is shown in Fig. 4. In this particular model the nose block and No. 1 former were used to start the assembly. As may be seen from the picture, it is not necessary to continue all stringers to the rear as they get too close together there. Also the hole through each former for the motor stick and rubber may be clearly seen. The forward part of the fuselage is covered, and the former visible just to the rear of the cockpit is No. 3.

The next type of fuselage is that which has all wood sides. This is very simple to build but rather heavy. It is used principally in making models of cabin type ships. The two sides are cut out from thin balsa, 1/32" thick being about right for 14" to 18" wing spread models. The entire side view of the fuselage may be traced on the wood from your drawings, cutting in the window holes at this time also. Then formers of the proper shape are cut out also from balsa, making sure the grain runs crosswise of the fuselage. About the same number of formers as were used in the last type fuselage are needed, except, of course, that they must be rectangular in shape. The best way to start assembly is to glue the rear ends of the sides together and the rear former in place and let dry. Then install the remainder of the formers, working towards the front, the nose piece going on last. The top and bottom of such a fuselage are usually paper covered, although thin wood may be used at the expense of greater weight. The nose, back as far as the windshield, may need a few bamboo strips to hold the paper covering out to proper shape.

THE last type of fuselage to be fully described is the hollowed out, all balsa type. This, in the writer's opinion, is the last word in scale model fuselage construction. It has everything we desire, absolutely accurate scale shape, strength, reasonably light weight, and it can be perfectly finished with paint or colored dope. Contrary to the general idea, this type is not extremely hard to make. Possibly it takes a little more care or time but then, what model construction doesn't that is really worthwhile? Besides, it makes the covering of the model lots easier because the worst part of the job, the fuselage, is already done. If the hollowing out job is well done, the weight will be only slightly more than a built up fuselage.

To start with, get two pieces of balsa each a trifle more than one half the width of the finished fuselage and a little longer and deeper, the extra wood being left for finishing off. Glue the two together lightly, that is, do not use much glue and put it along the middle of the blocks. Clamp the pieces or put weights on them so they will be held tightly together while gluing. You now have a block a trifle larger in all dimensions than the finished fuselage is to be. Next draw or trace on the side of the block the side outline view of the fuselage and cut this out. A saw may be used to speed the work and the finishing done with a sharp plane and sandpaper. Now trace one-half the top outline on paper, cut this out and use as a pattern for both halves of the fuselage, in this way getting them the same shape. Cut off the excess wood and smooth off and you will have a block of rectangular cross section, the top and side outlines of which are the same as those on the drawings. The final outside shaping is now done, and if any templates or cross-sections are furnished with the drawings, cut them out and try them at the proper place until the shape is correct at that spot. These templates are always furnished as

one half the cross section so both sides of the model may be made the same.

The finishing of the shaping should be done entirely with coarse sandpaper held over a block, using fine paper last. Now split the two halves apart using a razor blade only. The hollowing out is done entirely with a gouge, about 3/8" being a good size. Leave plenty of wood at the nose for balance and strength. About one-third back from the nose the average thickness may be about 1/8" tapering to 1/16" at the tail, these sizes being for a fuselage about 18" long. When you get most of the wood cut out, hold the half up to a strong light and cut away the dark portions more. Leave the edges about 1/8" wide all along so a strong joint may be made. If you cut through the side simply glue the chip in and cut more carefully when it has dried. To finish the inside, hold sandpaper over a can or other form 1 1/2" or so in diameter and smooth down the ridges. Fig. 5 shows a fuselage of this type cut apart. Note the bulkhead at the center. Two are generally used, one as shown, and another between it and the nose. The bulkheads are best made in halves and glued in so the halves meet when the fuselage is assembled. Do not cut the cockpit in until the halves are glued together. Spread glue on all edges of one side and put the two together, holding them with half a dozen rubber bands. When thoroughly dry, sand the joint, cut in the cockpit and the job is done.

There are other types of fuselage construction such as wire work and so on but those given or combinations of them are the only ones suited to present day model work.

Air-Ways

(*Continued from page 39*)

it submitted to officers at Wright Field fooled even them.

"In a recent contest against the Central New York State champions, Woolery took three first places and his 15 inch endurance tractor which won him first place with a flight of 6 minutes 14 seconds, with only a 35-foot ceiling, is pictured in Photo 2. This plane has since done 6 minutes 38 seconds. It weighs, including rubber, 1/10th of an ounce, and has hollow wing spars, motor stick, tail boom, and uses 1/64th square ribs. For flights it is powered with three strands of .045 rubber. The wing span is 35 inches and the model uses a short tail boom and a 15-inch propeller.

"Photo 3 shows his newest outdoor plane ready for the local outdoor fuselage events and for use at the National Air Race contest this year.

"Woolery's list of records is impressive and the N. A. M. E. would like to know about any model builders who can submit a like record. In considering the times, the flight ceiling of 35 feet should be considered as should the varied list. Many model builders excel in one type, but look at this record.

"Indoor—8-inch scientific—4 minutes 6 seconds, 9-inch R.O.G.—3 minutes 19 seconds; 15-inch scientific—6 minutes 38 seconds; 20-inch fuselage, R.O.G.—4 minutes 32 seconds; indoor profile, 9 inches of rubber (National record)—1 minute 45 seconds. Outdoor—outdoor scientific—7 minutes 50 seconds, when lost sight of, sighted over a minute later still high in air and found over a mile from where last lost sight of. In all other outdoor contests he is consistently among the first five and seldom lower than third.

"This record is made more impressive by the fact he has been building models only slightly over a year. Woolery won one of the trips to the National Air Races last year and this year is far in the lead, having 180 points to 150 for the second place holder. He is 16 years old now and is a senior at Steele High School, Dayton, Ohio, and has been affiliated with the Dayton Model Airplane Club, local headquarters for the N. A. M. E. since he started in model building. Next year he intends to enter his aeronautical engineering course and intends to make aviation his life work.

"Every model builder in the world is eligible for membership in the National Advanced Model Engineers and they can secure full information about joining by writing to P. O. Box 1041, Dayton, Ohio, which is the address of the national organization.

The officers of the N. A. M. E. are: President, Major James H. Doolittle, Vice-Presidents for the U. S., Col. William Thaw, Capt. Holden C. Richardsonn, David S. Ingalls, Alford J. Williams, Charles H. Grant, Louis F. Ross, Edward T. Pachasa; Vice-Presidents for Canada, Colonel William Avery Bishop, Capt. A. Roy Brown; Vice-President for Poland, Capt. Boleslaw Orlinski. D. F. Chase of Dayton, Ohio, is the National Director.

Redwood Eagles Club

PICTURE No 33 shows the small but very active Redwood Eagles Club of Eureka, Cal. Mrs. J. H. Brown, the instructor and sponsor of the club, is an enthusiastic model builder. She is to be highly complimented for her progressive spirit in taking up this work. Mrs. Brown tells us that as they are some distance from San Francisco, they are unable to compete with other clubs. Possibly she would appreciate it if readers of MODEL AIRPLANE NEWS would write to her and if convenient, arrange some sort of contest which would enable them to gain greater experience as well as become more active in the model airplane field.

Picture No. 34 shows a Fokker D-7 which was built by Mrs. Brown. We cannot say too much in commendation of this progressive young woman.

Danvers, Mass., Has Model School

The following letter has been received from Mr. Irving Day of the Danvers Model School, Danvers, Mass.:

"I would like to inform you that the Danvers Model School is going to have a model airplane contest, September 4 of this year, for all boys who would like to enter their plane or planes in said contest. The entry fee will be 15 cents and if further details are wanted, please write to Model Airplane School of Danvers, Mass., in care of Irving Day, 2 Dodge Court, Danvers, Mass."

—Attention!—

"I would like to hear from boys interested in joining a model airplane club. Boys should live near enough to attend meetings. Our club is named National

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A Solid Scale Model of the Dirigible Fighter

(*Continued from page* 9)

for the side. Shape the rest of the wooden parts as indicated in the plans, and sand paper them to a smooth finish.

STEP 3—ASSEMBLY

The model is now ready for assembly and you can cement the parts together carefully. On landing struts and wing struts where streamlining is necessary at the ends and joints, use plaster of paris. First experiment with the plaster to get the right consistancy before applying.

STEP 4—PAINTING

You are ready to do your paint job but before starting a word of precaution is necessary. To get a glossy finish is not as simple as it seems. Great pains must be taken or the finished job will be far from satisfactory. The first coat of paint must be sanded, smooth to make a good base for the next coat. If this is not done the next coating of paint will appear ugly and ragged. The secret of a good glossy coat of paint is a smooth base. Paint in one direction, with the grain, and use a good brush. If the paint is lacquer or colored dope and it blushes (turns white in spots) paint over the places with banana oil or some thinner. Enamel paint is better to use but it takes longer to dry. Decide for yourself which kind you would prefer to apply.

STEP 5—FINISHING

The finishing of the model is just as important as one of the steps in the construction, for here the real beauty is put on the model. Now is the time to put on detail like wires, windshield, etc.

Special Notes

Wings.—Be sure to put camber in both wings. Bottom wing is one piece. Top wing is two pieces. Round off root of each and cement to fuselage by making a slight groove in body to hold it.

Fuselage.—If open cockpit is desired, drill hole and place in details. It is impossible to give exact data for cockpit detail. The alternative is to place in an ordinary seat, control, instrument board, etc. Cut off tip of fuselage block for a nose block; shape it, cement the motor and replace block on the front end of the fuselage.

Rudder.—Rudder extends up to the cockpit in the form of a streamlining for the headrest.

Stabilizer.—Stabilizer is one piece. Cement to fuselage after making cut in the end of body. Then replace the piece of wood cut out or make a new plug. See plans.

Landing gear.—Where strut meets fuselage there is a small streamlined block. Make a hole in both block and fuselage and slide in strut and cement. Be sure to streamline joint, where pants and strut meet, with plaster of paris. Pants can be carved from wood, or celluloid pants can be purchased.

Motor and Prop.—Either make motor and propeller from wood or buy ready made celluloid motor and metal prop.

Drag Ring.—If ready shaped ring is not purchased, simply wrap a strip of aluminum around the motor and pin at bottom.

Color.—Fuselage silver—under part of top wing, silver, and top, yellow—top of bottom wing silver, and bottom, yellow—landing gear, including pants, black—rudder and stabilizer yellow. Wing insignias go on top and bottom wings near tips.

List of Materials

Fuselage, balsa, 1-1/16 x 2 x 9—1 piece.
Top wing, balsa, 1/4 x 2-1/4 x 6—2 pieces.
Bottom wings, balsa, 3/16 x 1-5/8 x 11—1 piece.
Stabilizer, balsa, 3/16 x 2-1/4 x 4-1/4—1 piece.
Rudder, balsa, 3/16 x 2 x 4-1/4—1 piece.
Land gear streamlining, balsa, 1/4 x 1/4 x 1-1/4—2 pieces.
Tailskid streamlining, balsa, 1/4 x 3/4 x 1/2—1 piece.
Wing struts, spruce, 1/8 x 1/16 x 12—1 piece.
Landing gear struts, balsa, 1/8 x 1/4 x 1-3/4—2 pieces.
Cement, sandpaper, etc., mentioned on plans.

—o—

Advisory Board

(*Continued from page* 36)

In answering this question briefly, I should advise that you begin to build types of models known as the stick type, which and simple and embody only the absolutely necessary factors for flight.

In regard to tools, a penknife is a first thought. A pair of cutting pliers for wire work, one pair of flat-nosed pliers, one of round-nosed pliers, a few fine saw blades and some sandpaper, are also required. These are the "A B C's" of your shopwork. Of course there are many more which will help you in your work, but which are conveniences rather than necessities.

Are Teeth Flying Equipment?

Well, here we have a question by a young man whose name I am not at liberty to mention at the present time. We have all sorts of questions that come in to us, but this one is very unique and unusual, to say the least. It is: "Will a civilian be accepted as a flying cadet if he has false teeth or a bridge?" I am sure some of you will see a great deal of fun, and possibly something to smile at, in this question. However, I must say I admire the young man for coming out and stating his case exactly. It is not uncommon for pilots who have been flying for some years to be afflicted in this way, especially after a few crashes and landings on their face. I should say, in answer to this question, that this would not prevent a normal person from being accepted as a flying cadet. The best way to determine this question is to write to the school to which you expect to go for flying training. I can tell you positively that this would not prevent you from passing a physical examination for a private pilot's license, provided that you were in proper physical condition in other ways, especially regarding the eyes.

What Causes Torque?

Here we have a question from George Robinson, of Prospect Park, Pa. He wishes to know how to correct propeller torque. In a previous answer in the Advisory Board, I told my readers that propeller torque is due to *too little blade area*, meaning too small a propeller. If a propeller, which is of too large a diameter, is put on a machine, the blade reaction will be

so far from the hub that it will have a tendency to turn the machine over in a flight. However, when I say "increase the blade area," I do not mean increase the diameter. By increasing the BLADE AREA, the blade will act at a smaller angle of attack as it passes through the air. This small angle of attack will cause less resistance to the blade's passage and, therefore, less torque reaction. If the propeller blade area is too small, the blade acts at a very large angle of attack, for example, possibly 10 degrees, at which angle the resistance is extremely large (consequently the propeller torque is large), and the thrust comparatively small. I think Mr. Robinson will possibly understand my meaning more clearly if he will read over carefully my answer given in the previous issue. A very good point to remember regarding torque is that torque is due to the resistance of the blades as they pass through the air. If you can lessen this resistance, then your torque will become less. Resistance is less if the propeller can be made of such area that the blades pass through the air at about 4 degrees angle of attack. This does not mean that the blades should be 4 degrees to the plane of rotation. In order to be assured that this condition exists in your model, make the propeller so that the area of the blades are approximately 1/10 of the wing area. This will reduce the torque to a minimum.

Air-Ways

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Model Airplane Club. We have our headquarters in the Mortgage Company's Building at Bogota, N. J., and have a very competent Commander to supervise operations."

Hartford Contest

JOSEPH WARREN of Hartford, Conn., won the Model Airplane News medal in the scale model contest of the Connecticut Model Airplane Meet held in the State Armory, Hartford, on May 28. Warren's ship, a replica of the Gloucester seaplane, was awarded third place honors in the scale model contest, his ship being surpassed only by a supermarine S-5 built by John Tyskewicz of Hartford who took first honors, and John H. Gryzwna, whose Boeing P-12-B was awarded second place honors.

The Meet was conducted by the Hartford Aero Model Club and the Connecticut Model Airplane Association, a State organization. The Hartford Aero Model Club scored 35 out of 45 possible points. The New Britain Junior Achievement Model Airplane Club was second with 9 points, and the Stamford Model Club was third with one point. Other clubs that participated were: the 43rd Division Model Club of Meriden, High Hatters of Southington, Hat-in-Ring Club of Norwalk and the Hillhouse Model Club of New Haven. Forty-three club members entered 86 different ships. The contest began at 9.30 A. M. and ended at 4.30 P. M.

F. Webster Wiggin, manager of the Curtiss-Wright Flying Service at Hartford, acted as contest director, and C. Donald McKelvie, Young Men's Secretary of the Hartford Y. M. C. A., served as contest manager.

National Model Championships in Canada

Formal announcement is made that the Third National Championship Meet of the Model Aircraft League of Canada will be held at the Stevenson Airport, Winnipeg, Manitoba, on Friday and Saturday, August 26 and 27, under the direct auspices of the Aviation League of Manitoba.

Atlantic City Contest Assumes National Import

The first annual contest to be held under the auspices of the National Model Builders Contests, Inc., at Atlantic City, N. J. will be held on September 10 and 11.

There will be four outdoor events, rules for which follow. This contest will take place at the Atlantic City airport and will be open to all model builders. There will be hundreds of valuable prizes, free trips, silver trophies, medals, magazine subscriptions, etc. Arrangements are being made for a special train from New York City that will stop at all stations along the way.

A big indoor contest will be one of the features, rules and particulars for which will be published in the next issue. For further information write to Irwin S. Polk, contest chairman, Bamberger Aero Club, Newark, N. J.

Among organizations lending their support are the Atlantic City Exchange Club, N. J. Affiliated Exchange Clubs, and the National Exchange Club.

The events and rules are as follows:

Twin Pusher or Tractor

Two motors and propeller models of the open type construction. Main wing area not less than 125 sq. in. nor over 150 sq. in. Complete model must weigh at least 1 oz. for every 50 sq. in. of main wing area. Hand launched.

Fuselage Event (Commercial)

Models must conform to good engineering practice—i.e., they must have built up fuselage, stream lined throughout and resemble real airplanes—motor stick optional. Rubber motor must be completely enclosed, except for an opening of not more than 2 sq. in. to permit access to motor. The minimum area of the largest cross section or bulkhead must correspond to the following formula—overall length of fuselage multiplied by itself and the result divided by 100. Main wing area not less than 125 sq. in. and not over 150 sq. in. Complete model must weigh at least 1 oz. for every 50 sq. in. of main wing area. Model must have landing gear, with two or more freely revolving wheels in the forward section of at least 1¾ in. diameter and tail skid or wheel in the rear section. Model must take off from a three point position. Note — Example of fuselage formula— if fuselage is 30 in. long, 30 x 30 equals 900—divided by 100 equals 9 in., which is the required area. If you make your largest bulkhead at least 3 x 3 you will get the required area.

Glider Event

Model gliders of not less than 24 in. nor more than 36 in. span, (measured from tip to tip). Wings must be of built up construction, having an air foil covered on both sides. The model must resemble a real glider. Gliders are to be hand launched and without the aid of artificial power or apparatus.

Exhibition Scale Model

A model which is an exact replica of a man-carrying machine, every part being

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The Man Who Never Came Back

(*Continued from page 15*)

tail. So quickly had Dorme gone into his power dive that this second German, completely numbed by the quick maneuver of the Frenchman, was unable to twist his own ship out of the way in time. Nieuport and Aviatic crashed in midair.

Fortunately for Dorme, his own craft proved to be the sturdier of the two and managed to withstand the terrific impact. The unhappy Boche who was second party to the crash ceased being a factor in the war then and there. His machine, crushed by the blow, fell to bits with parts fluttering to the ground piece by piece, the miserable pilot clinging in desperation to what was left of the fuselage until flames compelled him to release his useless hold and drop to his death alone.

During the following torrid month of August, Lieut. Dorme added an additional six official victories to his recognized total. How many more than the official six losses the Germans suffered at the hands of this bold French pilot no one on the Allied side except perhaps Dorme himself knew. Many of his trips were made deep into German territory where his combats, unwitnessed, failed to get the required three observers for official cognizance. Dorme did much of his fighting over enemy territory, a fact well known to his flying brethren.

Knowing his reputation, one of his superior officers one day remarked upon this point to Dorme. "How many ships have you really destroyed?" he queried.

Dorme's reply was typical of him. "The Germans know. That is all that matters."

By this time the genial lieutenant had firmly established himself as one of the leading warriors of the notorious squadron.

He and one of his fellow Cigognes, Capt. Heurteaux (whose mighty record was chronicled in the April issue of Model Airplane News) got into a friendly rivalry over the number of enemy ships destroyed. They ran neck and neck for a time for premier honors of the squadron in this respect. Dorme and Heurteaux each brought down ship after ship to swell their totals week in week out and both kept their top figures in close proximity. Heurteaux finally managed to conquer a few more and pull ahead a bit in the standing when Dorme put on some real pressure and in one short week's time shot down eight of the enemy's planes to take a definite lead in the rivalry, a lead he never relinquished until he was lost to the Cigognes forever.

The fame of Dorme's exquisite handling of the controls had spread throughout the front. Germans as well as Allied airmen came to recognize the unequalled tactical ability of this cool and resourceful pilot whose flying skill was becoming something uncanny. It was Dorme who originated the "wing slip" which proved to be a most successful stunt for getting out of line of the enemy's fire or dodging away from a sudden attack.

The attitude of the German flyers toward Dorme (his name was painted boldly on both sides of his plane for friend and foe alike to see) is ably illustrated by the remark of a captured German officer whom Dorme had sent to earth behind the French lines out of control but unhurt. Instead of expressing regret that he should have lost the conflict, the German spoke with obvious pride in his voice when he said, "It was Dorme that brought me down."

With his tenth Boche officially destroyed and accounted for, Dorme gave his companions something to talk about that endured through the war. Hailed as a marvel at the controls, Dorme was an almost impossible target for enemy bullets. For this reason he had been given the second nickname of Dorme "the unpuncturable." How true this cognomen fitted is attested by the fact that when his tenth victory was chalked up and mechanics went over his plane with a fine tooth comb to service it they could find but two bullet holes anywhere through the entire machine.

But there are exceptions to every rule and Dorme created one in short order. During the summer, on an early morning sortie "Pere" ran against an enormous Fokker triplane—a flying fortress or winged battleship if ever there was one. This ship carried two gunners besides the pilot and each of the three men were provided with machine guns for both offensive and defensive purposes.

Pitted against the tiny Nieuport Dorme was flying, the odds were all in favor of the Germans, but odds meant nothing to this intrepid Frenchman. Continuously circling the huge ship with his more maneuverable little craft, Dorme pumped round after round into the sturdy Goliath of the skies.

But for all the shifty qualities of his trim and speedy little Nieuport, this was one time when it could not keep from the reach of tne foe's devastating barrage of shells. The only escape from the German bullets lay in a clean getaway—something Dorme would never think of. With machine guns shooting at him continuously from all sides of the mammoth cross-marked craft, Dorme could not get in a single blast from his own gun at any time without taking withering blasts in return.

This terrific battering he absorbed willingly, oblivious of the chance that at any time a shot might prove fatal to him personally, until he had attained his objective. The mammoth triplane, despite its strong build, could finally endure no longer the constant pounding and hammering which the expert markmanship from Dorme's gun was dealing out. It began to crack up bodily in mid air, cut as it was almost into shreds. Still it did not catch fire, falling instead a wrecked hulk all out of control, its wires snapped and useless and the wings so frayed they would hardly bear its weight.

As it started down Dormes swept along in its wake like a tiny but ferocious hawk worrying a massive wounded eagle. His smoking, fire-belching gun continued to drum a steady tatoo of death on the stricken giant of the air and its horrified occupants. When the huge ship crashed at last close by a patch of woods near Fromezey, the spellbound poilus who had witnessed the thrilling encounter, rushed toward the wreckage to capture or subdue its crew if they still lived. But Dorme with his customary skill had done his job to perfection. Not only was the machine completely ruined but its members were all

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Air-Ways

(*Continued from page 43*)

proportional in size to the corresponding parts of the larger airplane. Models will be judged as follows: Neatness of workmanship 30 points; Amount of detail 30 points; Originality in reproduction of parts 30 points; Color and finish similarity 10 points. Blueprints, pictures and typewritten history of model, will assist in judging. Such descriptive material, with name and address of owner must be securely attached to model.

General Rules

1. A period of time will be alloted for each event. Contestant can make flights only in the designated time.
2. Contestants will be allowed three flights in each event. One of the models may be used to obtain these flights.
3. A contestant may win only one prize in one event.
4. In case of a tie, the tieing contestants will again compete with three flights, each using the tieing models.
5. All models must be made, flown by and the property of the entrant.
6. All models, except gliders, must be rubber powered and must drop no parts in flight.
7. No restriction on design, except that they shall come under the classification as provided in these rules.
8. No contestant shall launch his model before receiving the launch signal from the timer.
9. Any contestant breaking the rules of this contest or subsequent ones which may be sent out in writing, shall, upon the recommendation of the judges, be disqualified. Contestants may be disqualified upon the violation of any accepted courtesy.

Notice

We wish to correct a mistake in the title of Picture No. 24, page 24, appearing in the Air-Ways column of the July issue of Model Airplane News. The title should be: Winners of the recent Model Plane Contest Held by the Bamberger's Model Airplane Club of Newark, N. J.

Aerodynamic Design

(*Continued from page 23*)

on the blades as pulling directly forward, which is not the case.

Also, it may be seen that all propellers with the same pitch diameter ratio (or blade angle) require the same blade areas for any *given required performance.* (Tables of required blade areas for various pitch diameter ratios will be given later.)

It is now our task to determine what the blade area should be for different pitches and diameters, and develop a formula for blade area in terms of these quantities, Pitch and Diameter. As an approximate method, we may multiply the formula, just derived, by

$$\frac{\sqrt{P^3}}{\sqrt{(1.5D)^3}} = \frac{P\sqrt{P}}{1.5D\sqrt{(1.5D)}}$$

We will then have a fairly accurate formula as follows:

$$a = \frac{[(3.6)A + (0.414)U]P\sqrt{P}}{150D\sqrt{D}}$$

In determining the necessary area for our 8" propeller with a 12" pitch, we found that if the blade speed through the air was the same as the speed of the machine, then the area of the blades should be 1/10 the wing area, for horizontal flight. However, we found that the blade speed was greater as it traveled farther in the same amount of time. The distance the plane travels in one propeller revolution is indicated in Fig. No. 33 by (AZ), which is the pitch of the propeller.

The distance that the point of average effect of the blade travels in one revolution is represented by (AB) which equals

$$\sqrt{\left(\frac{2\pi D}{3}\right)^2 + P^2}$$

Therefore the speed of the machine is proportional to (P), the pitch, and the speed of the propeller blades is proportional to

$$\sqrt{\left(\frac{2\pi D}{3}\right)^2 + P^2}$$

Distance from (A) to (B).

Now we can see from the formula $L = K a V^2$, or $a = K \frac{L}{V^2}$, that (a) is inversely proportional to the velocity squared, or we may write it as follows, the thrust (L) being (1), or unity,

$$a = K\frac{1}{V^2}$$

If the propeller blades have a velocity $(AZ) = V$, Fig. No. 33, then the area (a) should be equal to (1/10 A) or one-tenth the wing area. That is, $a = \frac{10}{A}$.

However, if the propeller blades travel at a velocity $(AB) = V^2$, then the velocity

$$V_2 = \sqrt{\left(\frac{2\pi D}{3}\right)^2 + P^2}$$

Distance from (A) to (B)

and the blade area in this second instance (a) should be expressed as follows:

$$a_2 = K\frac{1}{\left(\frac{2\pi D}{3}\right)^2 + P^2}$$

We can also see that, $\frac{a_2}{a_1} = \frac{V_1^2}{V_2^2}$ because, the two areas are inversely proportional to the square of the two velocities. Then $a = \frac{a_1 V_1^2}{V_2^2}$. Now substituting in the formula, the values we have already calculated for the various quantities, i.e.,

$$V = AZ = P,\ a = \frac{10}{A},\ V_2 = \sqrt{\left(\frac{2\pi D}{3}\right)^2 + P^2} \quad \text{we have,}$$

$$a_2 = \frac{\frac{A}{10} \times P^2}{\left(\frac{2\pi D}{3}\right)^2 + P^2}$$

$$= \frac{AP^2}{10\left[\left(\frac{2\pi J}{3}\right)^2 + P^2\right]}$$

This formula gives the value of (a), the Blade Area, for *Horizontal Flight*, to an approximate degree only, for here the thrust on the blades is calculated as perpendicular to their chords, line (AR) in Fig. No. 34, and not parallel to the forward line of flight as it should actually be, as shown by line (AZ).

We must, therefore, determine what the formula would be for the Blade Area, when the proper amount of thrust acts parallel to the line of flight.

This necessary thrust, to be developed

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by the propeller, may be represented by line (AZ), Fig. No. 34. Line (AB) represents the amount of thrust which was previously taken as necessary, in working out our formula. Therefore the New Blade Area, is to the Old Blade Area, as given in the formula just developed, as Line (AZ) is to line (AR), or

$$\frac{a_2}{a_1} = \frac{AZ}{AR} = \frac{AB}{ZB}.$$

$$\text{So } \frac{AZ}{AR} = \frac{\sqrt{\left(\frac{2\pi D}{3}\right)^2 + P^2}}{2/3\,\pi D} = \frac{a_2}{a_1}$$

$$\text{or, } a_2 = \frac{a_1\sqrt{\left(\frac{2\pi D}{3}\right)^2 + P^2}}{2/3\,\pi D}$$

Then substituting,

$$\frac{AP^2}{10\left[\left(\frac{2\pi D}{3}\right)^2 + P^2\right]}$$

the *old* required Blade Area for the value of (a_1) in the above formula, we have the Correct Blade Area

$$a = \frac{AP^2}{10\left(\frac{2\pi D}{3}\right)\sqrt{\left(\frac{2\pi D}{3}\right)^2 + P^2}}$$

This may be written as follows, so far as practical results are concerned:

$$a = \frac{AP^2}{20\,D\sqrt{(2\,D)^2 + P^2}}$$

This formula gives the TOTAL BLADE AREA required for any propeller whose camber and angle of attack is the same as the camber and angle of attack of the wing.

The average propeller may be taken as having a camber of one in twelve or (1/12). (Heighth of camber—1/12 the chord). So we can say that the formula is true for a wing camber of 1/12 (for single surface wings). (For double surface wings with a flat lower surface it is true for a top camber of 1/9.)

The resistance of the wing increases directly as the camber increases, on the other hand, the wing resistance may be taken approximately as (2/3) the total distance of the machine. So in our formula, the quantity taking care of the variation in camber has been figured in its development, as ("One" when C=1/12) where (C) is the wing camber. This quantity should then be [1/3 + (2/3 x 12C)], to have it equal "One" when (C) = 1/12.

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So multiplying the right side of our equation by this quantity, the formula for Propeller Blade Area becomes,

$$a = \frac{AP^2\,(1/3 + 8C)}{20\,D\,\sqrt{(2\,D)^2 + P^2}}$$

where *Camber* is taken into account.

In the quantity $(1/3 + 8C)$, $1/3$ is the portion of (a) necessary to drive the model through the air without the resistance of the wing. The quantity (8C), is the portion of (a) required to overcome the wing resistance.

When (C) equals (1/12), then the quantity $(1/3 + 8C) = (1/3 + 2/3) = 1$ which conforms with our requirements.

It is now necessary to consider the fact that we may wish to set our model wing at various *angles of incidence*. The propeller area required will not be the same with different incidence angles but will increase with an increase in this angle. The drag on the propeller due to the wing will become greater approximately in proportion to the angle of incidence (at any given speed) measured from the angle of zero lift, which is in the neighborhood of (-4) degrees. So we can say that $(4 + I)$ is the angle of incidence, where (I) is the positive angle at which the wing may be fixed. The formula so far has been developed on the basis that the wing and propeller blade act at equal angles of attack at any moment.

We know also that the propeller and wing aerofoil section is most efficient when acting at an angle of attack of $(+4)$ degrees. Therefore, we must determine the proper expression to insert in our formula on this basis. Then if you wish to use a smaller wing angle of incidence the formula will give the correct Blade Area for such a condition at the maximum climbing angle.

To do this by means of the formula, the quantity by which we multiply the formula, must equal "One" when the angle of incidence is four (4) degrees. It will then be correct for any desired angle of incidence we may chose. This condition is necessary because the formula has been established on a basis that the propeller blade and wing, act at the same angle of attack. Therefore, the "quantity" to put in the formula to represent the effect of a change in the "angle of incidence," should be, $\left(\frac{4+I}{8}\right)$, for, if,

$I = 4$ then. $\frac{4 + 4}{8} = 1.$

When we multiply our Blade Area formula as developed up to this point, by, $\frac{4+I}{8}$, it becomes,

$$a = \frac{AP^2\ (1/3 + 8C)\ (4 + I)}{160\,(D)\,\sqrt{(2\,D)^2 + P^2}}$$

In most cases the best value of (I) to use is about (2) degrees, for, then the wing angle of attack will increase from about (2) degrees when in horizontal flight, to (4) degrees, when the plane is flying at its maximum climbing angle. Under these conditions the propeller blades will act at about (6) degrees angle of attack. This arrangement will help the plane to level off gradually as the power grows less, at the highest point of the climb. It will also allow the propeller to act at about (4) degrees when the plane is in horizontal flight. Note (a rise of 1/16 inch for every (4) inches of chord, gives an angle of "One degree".)

Our formula in the present form will give the Blade Area necessary for horizontal flight for any Wing Area (A), wing camber (C), angle of incidence (I), propeller diameter (D) and propeller pitch (P).

Next month we will learn what we must do to have this formula take into account the angle of climb that you may desire for your model; the last formula required to design your propeller correctly.

The Man Who Never Came Back

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stone dead, each pierced a dozen times or more with machine gun bullets. Dorme's reputation as a marksman had not been won in vain.

But when the genial "Pere" himself landed after that engrossing conflict his own ship looked more like a sieve or piece of screening than the unscathed plane that the artful Dorme was known to fly. Even the master of his trade must bow to odds at times.

AT THE CLOSE of 1916, Dorme had 15 official victims to his credit, only Guynemer and Nunguesser having a greater total at that time. As the new year of '17 bowed into the calendar, Germany began to take definite leadership in aerial warfare on the Western Front.

After introducing its Albatross scout in the latter part of the old year, the Boches surprised with the new Albatross D-3 in March of 1917. This one ship alone was so superior a craft as to throw the weight of advantage definitely in the Germans' favor.

Outmaneuvered by better ships, the Allied airmen were being hard pressed not alone to attain victories but even to defend themselves against these new born German terrors of the sky.

But no nation could long endure a monopoly in that bitter conflict and soon France countered with the Spad. Trimly made, with its short wing span of a bit over twenty-five feet, this sturdy little craft was powered with either 150 or 200 horsepower Hispano-Suiza engines. As soon as the Spads began arriving at the front, French hopes took renewed life and French efforts renewed success.

Along with his fellow Cigognes, Dorme began adding to his total of Boches destroyed and by March of 1917 his official record stood at twenty-three. His many remarkable deeds had been adequately recognized and about every conceivable form of dcoration bestowed upon him.

The 25th of May dawned innocently enough. Dorme and a companion, Deullin, were up with the light of day, checked their planes carefully, and by 6:30 were off the ground, Dorme leading the way as the two ships sought altitude. Once high up over the clouds, Dorme noticed puffs of white smoke breaking out against the clear blue sky. White smoke at that altitude meant only one thing, Allied anti-aircraft shells bursting. That, in turn, meant German ships in the immediate vicinity. Dorme and his companion proceeded toward the spot.

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AIR MAIL STAMPS

How Model Experts Make Money With Their Aviation Knowledge

By M. SAGE

Last month I told the readers of MODEL AIRPLANE NEWS how they can use their up-to-the minute knowledge of aviation happenings to make money. As you know, air mail stamps carried on the first flights over new air routes are highly valued by professional stamp collectors, who will pay large prices to get the items for their collections.

Aviation enthusiasts hearing of a new air mail route, send self addressed envelopes to the postmaster at the flight's starting point, enclosing money for postage. The returned self-addressed envelopes, bearing the cancelled stamps, are then held by the senders for their sure rise in value.

Where first flights over new air mail routes have already been made and carried no mail addressed to you, it is still possible to pick up some good "buys" by snapping up any such stamps at low prices and holding them until their value is realized by the professional collectors.

Opportunities of making good investments of this kind are represented in the following recent first flights:

Russian Air Mail Route: Moscow Irkutsk to Vladivastock, via Tahita and Khaborousk, and Russian Route, Suerdlovsk to Obdorsk, via Tobolsk and Biresov.

The Lindbergh Stamp shown above was issued by Spain to celebrate the Spanish and American aviators of fame. Eight aces of aviation were illustrated in this historical issue, Lindbergh being the ace of aces. This original air mail stamp is obtainable for 25c. The black cat represents his mascot on the flight. The Statue of Liberty is the symbol of our country. It was sold at 1 peseta when issued.

This summer will provide many spectacular stunt flights which will allow model builder-stamp men to obtain valuable stamps to sell later on. Roy Ammel will attempt a non-stop refueling flight around the world; an Antarctic flight will be made; also a round trip refueling flight from New York to Rome. Most, if not all, of these and other stunt flights will carry mail, and the resulting stamps will be valuable.

A new Russian route will be opened from Novasibirsk to Suniplatatinsk on Sept. 1st. In November, 1932, a new route between Nekolawvsk and Petropavlosk will be opened. Address letters to Commissar du Peoples du Posts in each starting city with currency in dollar bills at rate of 20 cents per letter.

Local flights and aviation events which will have special interest to air mail stamp collectors will be held throughout the year. Watch for them and make money on them as described above.

Below are printed new issues which should be picked up and held for later sale:

Brazil—Zeppelin Air Post. Stamps inscribed "Zeppelin" with denomination in black ink. Values 3500 r. on 5000 r libra N. 300. Also 7500 r on 10,000 r, N. 299.

Bulgaria Air Post—Stamps show monoplane in flight over group of buildings. Name of country in Slavic characters. Colors and values 18L, blue green, 24L dull ultramarine.

For model enthusiasts who are interested in making air mail stamp collection one of their hobbies, MODEL AIRPLANE NEWS has secured an interesting booklet, "The Fiery Throne" which, by the courtesy of the Broadway Stamp Co., can be sent free to any boy upon the receipt by MODEL AIRPLANE NEWS of 3c for postage.

More about Air Mail Stamps next month.

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A friendly cloud or two helped the Frenchmen hide their approach until the last minute. Then, as they dropped in upon the German machines, the latter cutting short their reconnaisance work of French troop movements, scattered and headed for home immediately. Dorme and his friend figured that this meant that the Boches had some valuable data they did not wish to lose and so doubled their efforts to crush the invaders. A running combat followed, Dorme chasing two Germans far over their own lines, while Deullin, having cut off the retreat of another big scout, proceeded to shoot it to pieces. It fell within a few moments and Deullin looked around to see how his pal was faring.

Dorme was not in sight. Evidently he had finished his job, too, and was already heading for home. Deullin searched the sky but no trace of a Spad did he see. He continued flying around a bit longer, his worry increasing. But still why worry about Dorme, Dorme the unpuncturable, Dorme who rarely let a single bullet scar his ship.

The gas in Deullin's plane was running low and he had to start for home himself. Dorme would surely be there waiting for him. Still an uncertain doubt lingered in Deullin's mind as he winged his way back, an uncomfortable feeling he could not explain. Nearing the French trenches he thought he saw a Spad burning on the ground below. He dove down for a closer inspection which was useless. The flaming machine was too far gone. He could recognize neither hide nor hair of it.

In desperation Deullin sped for home to inquire for his friend. Dorme had not returned.

All day and evening the mournful Cigognes hung by the telephone awaiting the word that their cherished friend René Dorme had been forced down wth a stalled engine or an empty gas tank. But the blackness of the night fell to shroud the silent camp and still the news they so intently awaited failed to arrive.

One rumor after the other was received during the night, eagerly picked up and thoroughly scouted by the heartsick comrades of the lost man. Perhaps Dorme had fallen safely behind German lines and was unharmed. So they kept the fact that he was missing a dark secret. Dorme, alive, would surely get back safely.

Then one sultry afternoon a fortnight after his disappearance, the usual message fell to the Cigognes' airport from an enemy plane circling overhead.

"Pilot Dorme killed in combat" the sad tidings read. But no date was given, none of the particulars, not a bit of his personal belongings with which it was the custom to confirm such word.

Surely a German hoax as they offered no proof. Still, the secret had been well guarded and none but Dorme's intimate companions knew of his disappearance.

And so the friends that had learned to love their "Pere" Dorme so dearly could not believe that he was dead. But Dorme never returned and his passing is still a mystery as black as the night that fell on the 25th of May in 1917 to take the light from a life as full of honor, love and duty as any that saw service in the bitter conflict.